



*Keyhole Spring, Marble Canyon*

***BIOLOGICAL AND HYDROLOGICAL SURVEYS OF SPRINGS  
ALONG THE COLORADO RIVER, UTAH AND ARIZONA***

138/  
164/  
608/  
113/ } 161434

**SURVEYS OF SPRINGS IN THE COLORADO RIVER DRAINAGE IN  
ARCHES NATIONAL PARK, CANYONLANDS NATIONAL PARK,  
GLEN CANYON NATIONAL RECREATION AREA, AND  
GRAND CANYON NATIONAL PARK**

**PART II-Appendices**

*Final Report*

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National Park Service  
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Report to the

National Park Service  
Water Resources Division-WASO  
PO Box 25287  
Denver, CO 80225

Account No. 1445-7431-NWZ (1997)  
Account No. 1445-8250-NWZ (1998)

February 2004

XI. APPENDIX

A6. Original data sheets and sketches (duplicates) \_\_\_\_\_ 190

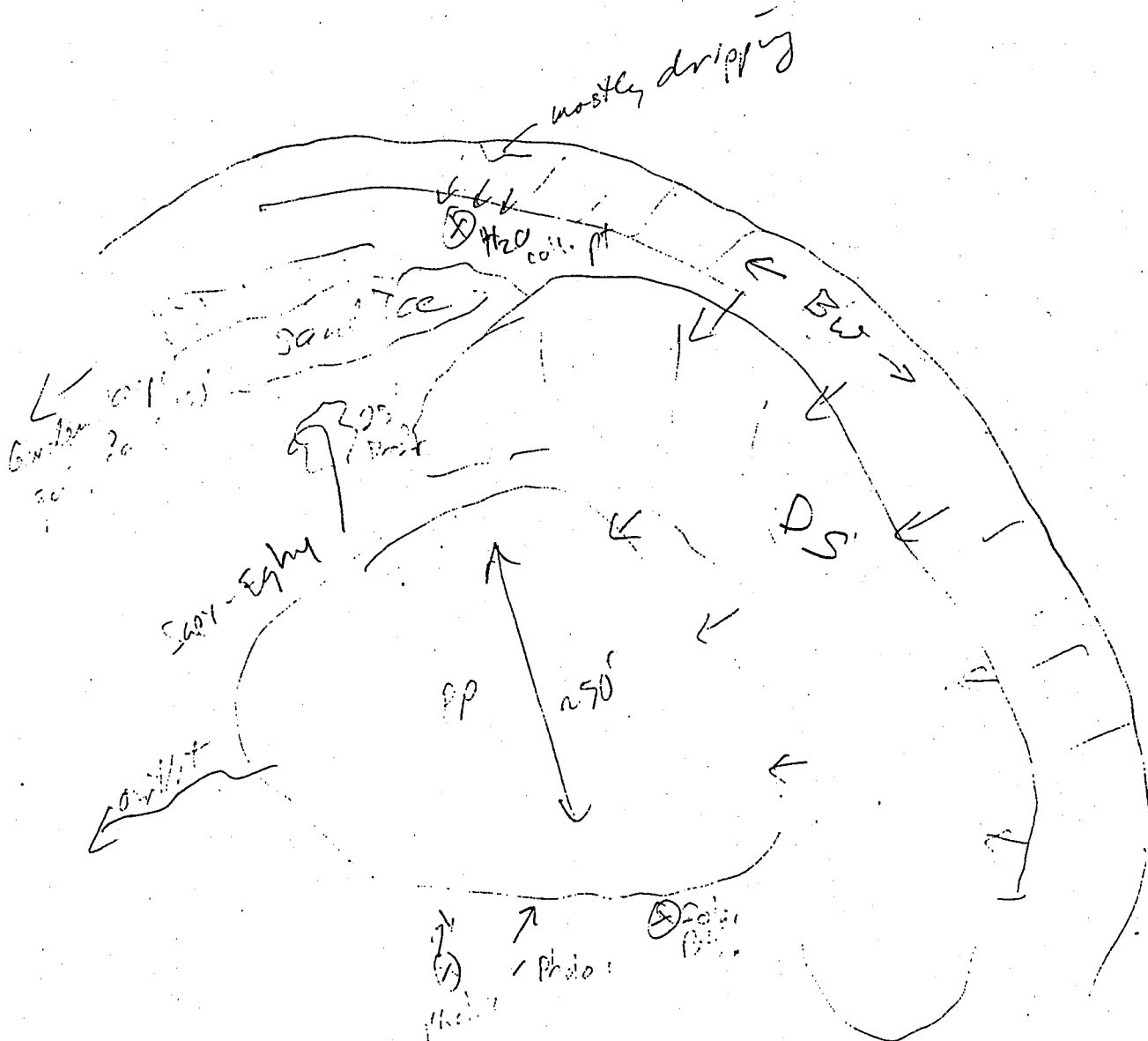
## A6. Original data sheets and sketches

**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	SSP -	Worker	DS
Location	ARCH - Sleepy Hollow		
Topo Map	UTM		
Transect/Releve No.	ARCH 3148	Date	7/13/48

Sketches below and on back

24-98



01-98  
24

HANGING GARDEN DATA SHEET

Investigator CS		Date 7/13/98	Releve ARCH01-98	Record
Garden location Sleepy Hollow, Gourdhouse Walk, ARCH		Aspect 230° WN	Geology <del>Granite</del> Mica Entrada	Size medium ~600-800 m <sup>2</sup> ES/BW
UTM		Distance from drainage ~1/6 mile	Structure classic Alcove	Elevation 4200'
		Water flow 3.0	Exposure 3.0	
Disturbance Deer, minor shearing, people-trails, trapping				
Species	General	BW	DS	PP
Tora		-	C	-
Cory		0	U	-
Soca		-	A	U
Gst!		0	0	0
Rowo		-	U	R
rose ! infl!		-	M	-
* Adonias!		-	R	-
Rhtr		-	0	0
* Aast		-	0	U
Eshy		-	0	C
Eball		0	0	-
Aqmi		0	U	-
Jukr / Juba		-	U	U
! Ziva		U	0	-
! Caag		-	0	0
! Hazo		0	0	-
Juan		-	R	-
MIRA		C	-	-
Caac		0	0	-
Pisp		0	-	-
Pahu		-	0	-
Muds			0	0

BW: Mica / Aqmi - Ziva

n = 10 exotics!

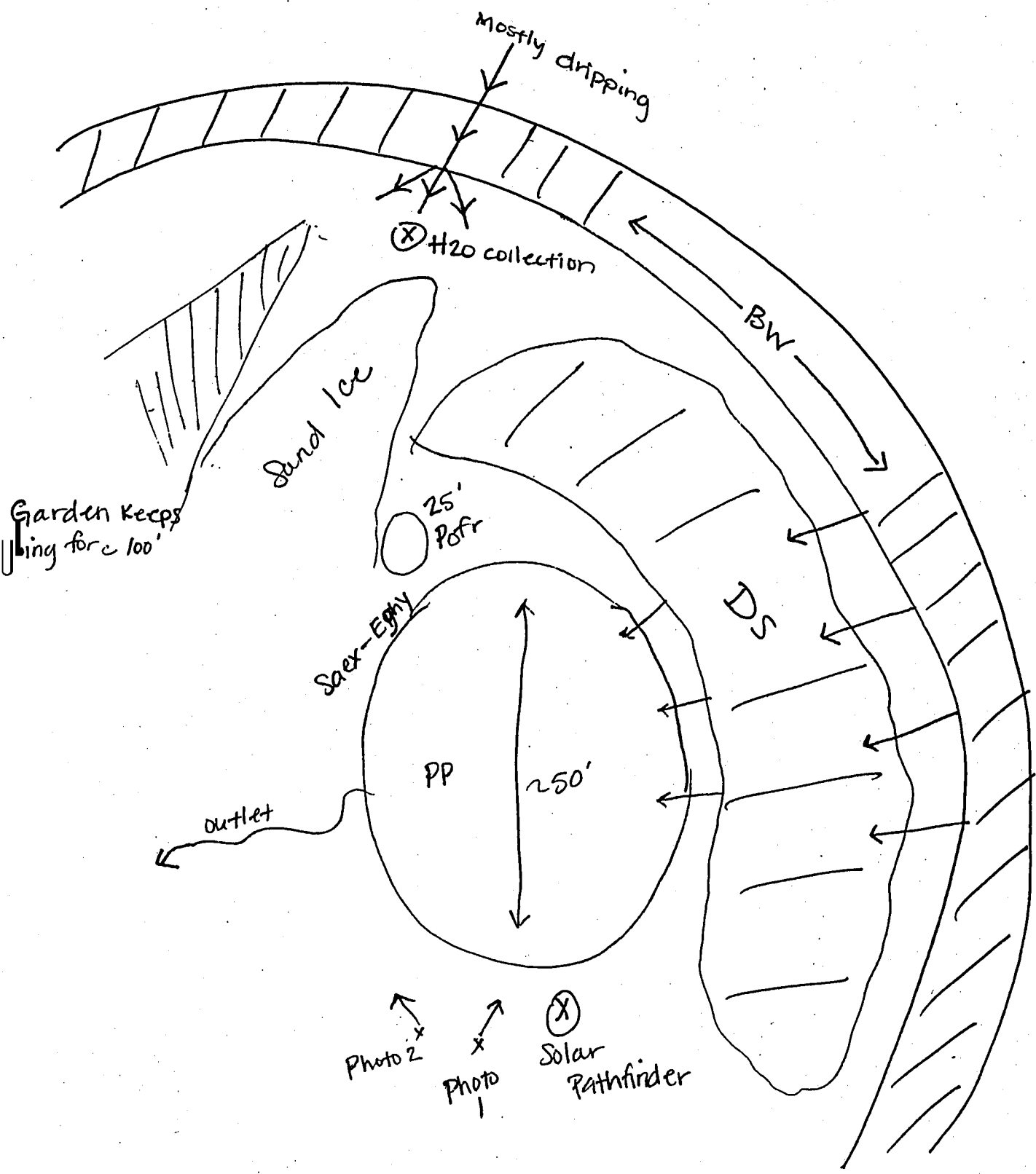


**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

<b>Site</b>		ARCH-01-98 Sleepy Hollow		<b>Date</b>		7/13/98		<b>Workers</b>		KIB	
<b>Site</b>	<b>Temperature</b>	<b>DO</b>	<b>Conductivity</b>	<b>pH</b>							
	18.5°C	7.2 mg/l	226 µS/cm	8.08							
<b>Water Flow Data (place unit of measurement below Volume)</b>								<b>Solar Pathfinder Data</b>			
<b>Volume (ml)</b>	<b>Time (sec)</b>	<b>Volume</b>	<b>Time</b>	<b>Volume</b>	<b>Time</b>	<b>Volume</b>	<b>Time</b>	<b>Month</b>	<b>%</b>		
540	1.13							Jan	13		
755	1.50							Feb	32		
585	1.25							Mar	40		
740	1.62							Apr	55		
940	1.81							May	59		
								June	59		
								Jul	59		
								Aug	53		
								Sep	47		
								Oct	32		
								Nov	26		
								Dec	13		

mean  $Q = 485.1 + 2\% = 494.8 \text{ ml/sec}$   
 (98% of flow estimated to be measured)

$Q \approx 495 \text{ ml/sec}$   
 $= 29.7 \text{ liters/minute}$



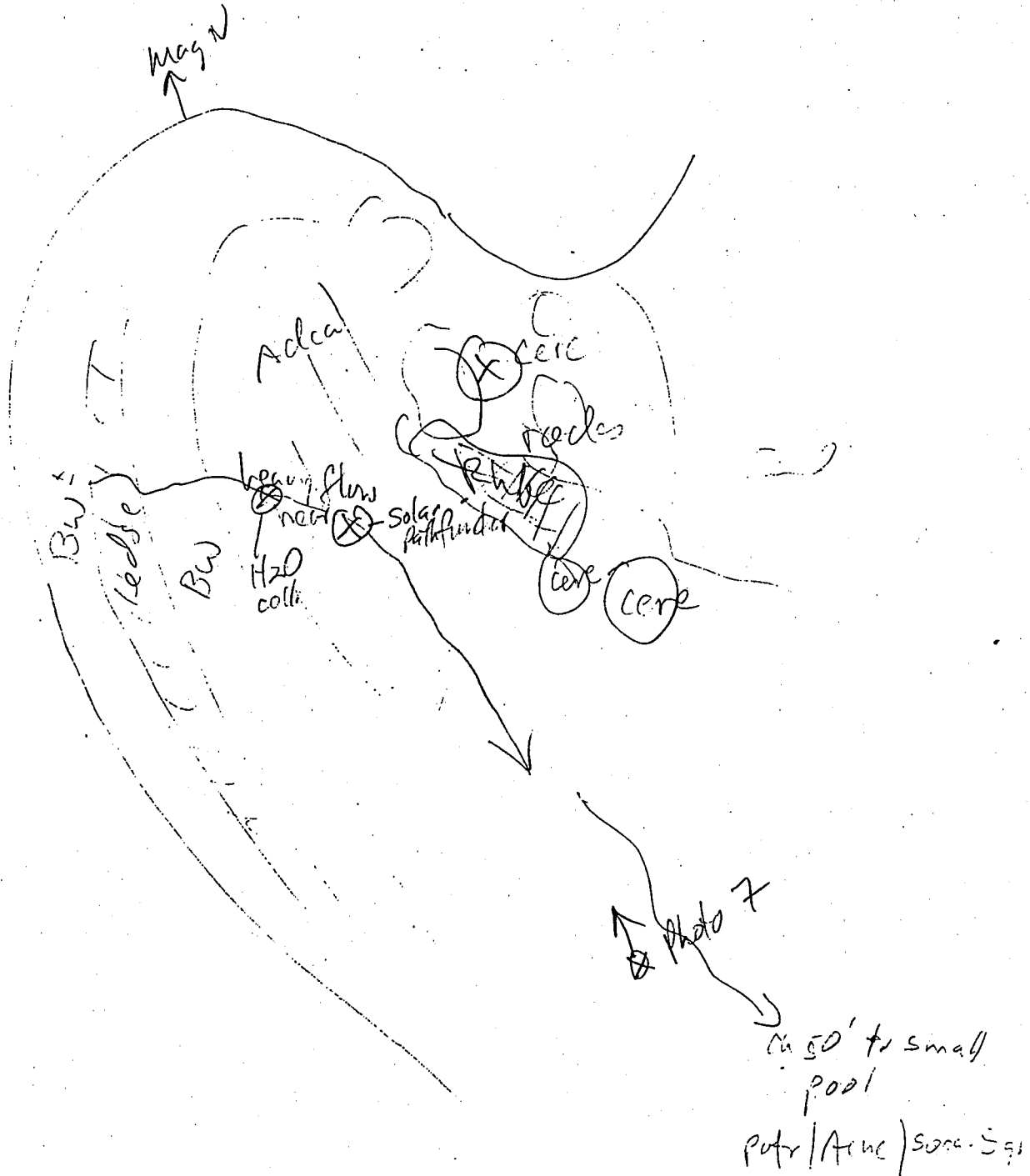


25-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	Spence
Location	7-mile Spring alcove,		
Topo Map			UTM
Transect/Releve No.	ARCH 153-98	Date	7/13/98

Sketches below and on back



### HANGING GARDEN DATA SHEET

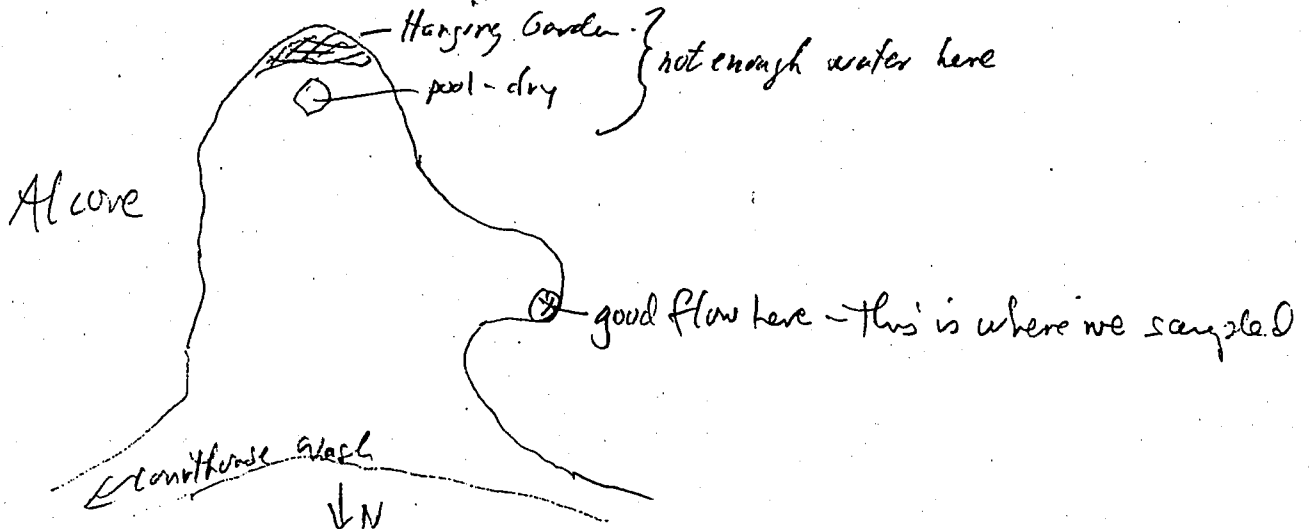
Excel

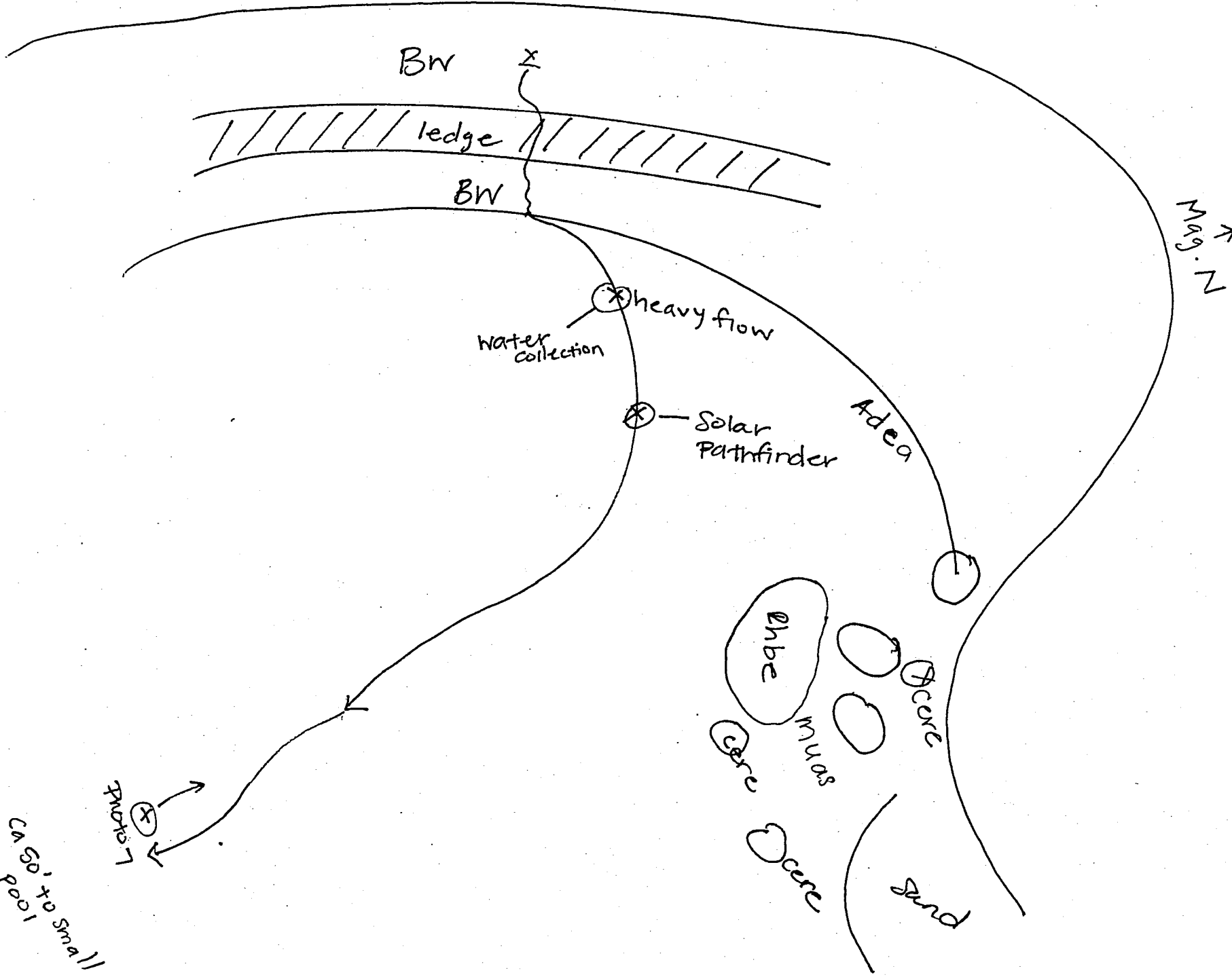
Investigator <b>JS</b>	Date <b>7/13/98</b>	Relieve <b>ARCY-03-98</b>	Record <b>25-98</b>	
Garden location <b>7-mile Spinn - at NW corner</b>	Aspect <b>190</b>	Geology <b>Ced. #159 Entrada</b>	Size <b>5m x ~100m<sup>2</sup></b>	
UTM				
Distance from drainage	Structure <b>BW-spring</b>	Elevation <b>4200'</b>	Water flow <b>3.5</b>	
			Exposure <b>4</b>	
Disturbance <b>recreational trampling, rockfall</b>				
Species	General	BW	DS	PP
Tomy		-	C	
Cork		C	U	
Rohbe		-	O	
Paac		-	O	
Eahu		-	O	
Ahmti		C	U	
Aldra		U	U	
Ziva		U	U	
Miea		U	-	
Cere		-	C	
<del>pp</del>		-	-	
Epia		-	R	
(Cerey sp. same as (R.H.01))		-	O	
Gist		-	U	
Brlo		-	O	
Prsp		O	-	
Smit	stream	-	O	
Muth Muis	stream	-	O	
Apea	stream		O	
<del>Soca</del>	U			
Aene	U			

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site		ARCH-03-98 Seven Mile Spring area				Date		7/13/98		Workers		KB	
Site	Temperature	DO		Conductivity		pH							
	18.2 C	8.1 mg/l		250 $\mu$ s/cm		8.26							
Water Flow Data (place unit of measurement below Volume)								Solar Pathfinder Data					
Volume (ml)	Time (sec)	Volume	Time	Volume	Time	Volume	Time	Month	%				
720	4.41							Jan	52				
325	1.97							Feb	51				
365	2.28							Mar	40				
400	2.41							Apr	14				
400	2.28							May	0				
								June	0				
								Jul	0				
								Aug	4				
								Sep	33				
								Oct	50				
								Nov	50				
								Dec	50				

$Q = 165.96 + 2\%$  (estimated 98% of flow captured) = 169 ml/sec





qoftr/ac / soca-  
egny

Can go to small  
pool

Prop 1

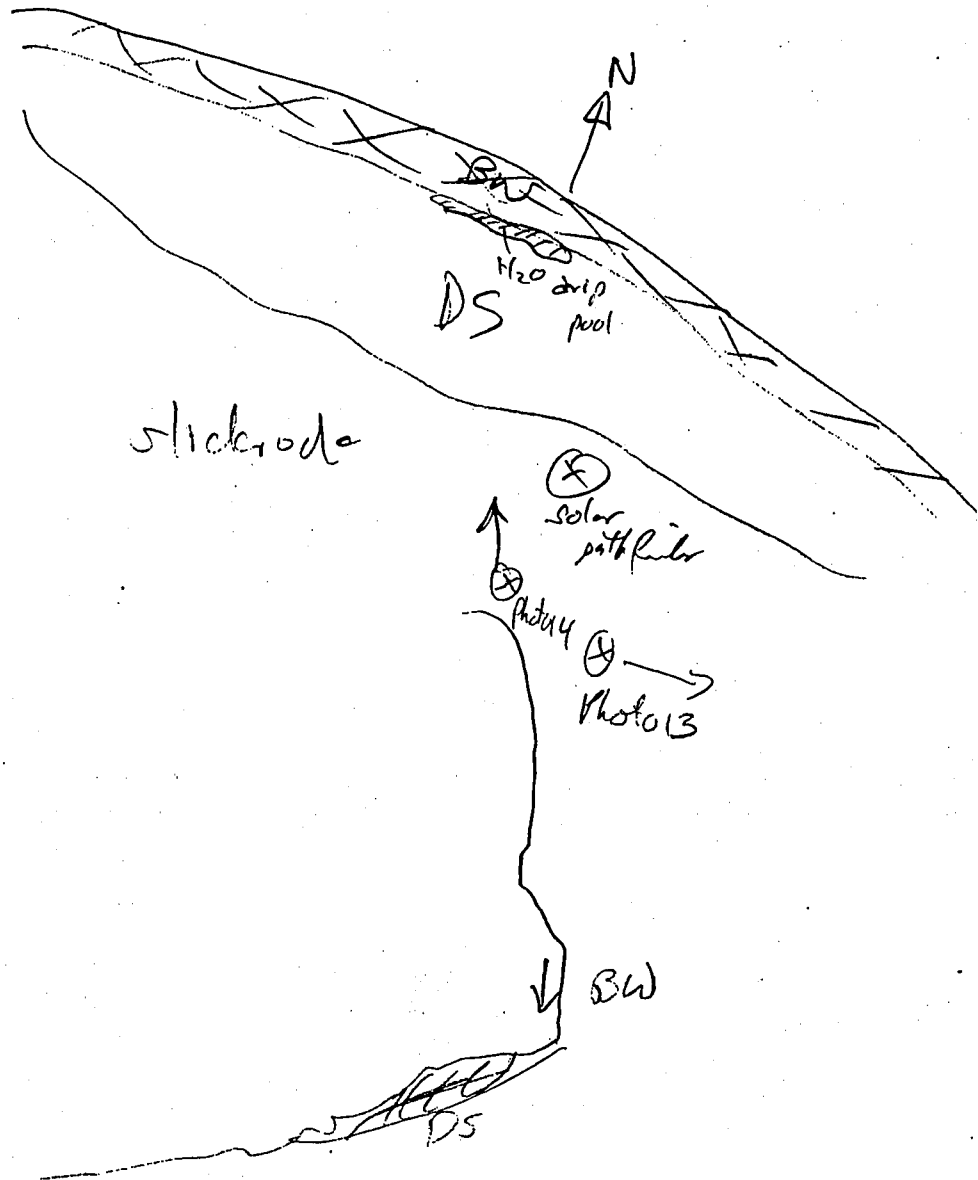
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GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	JS
Location	ARCH-above Freshwater Spring		
Topo Map	UTM		
Transect/Releve No.	ARCH-05-98	Date	7/15/98

Sketches below and on back

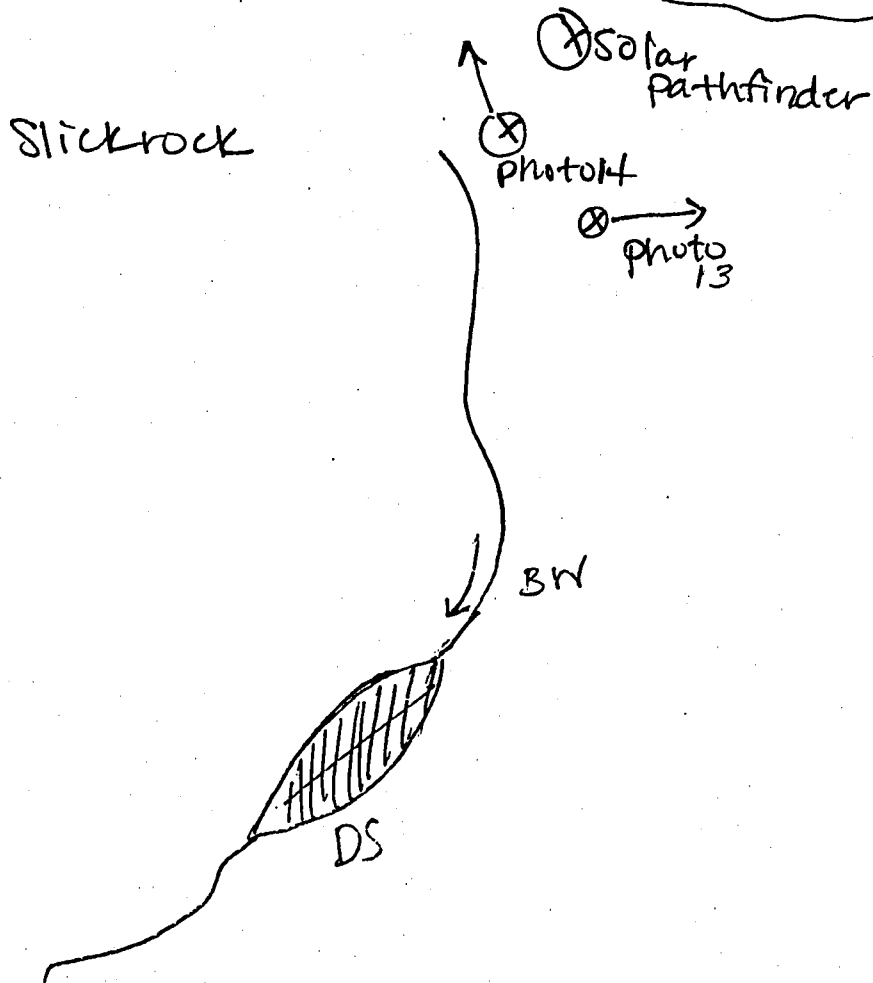
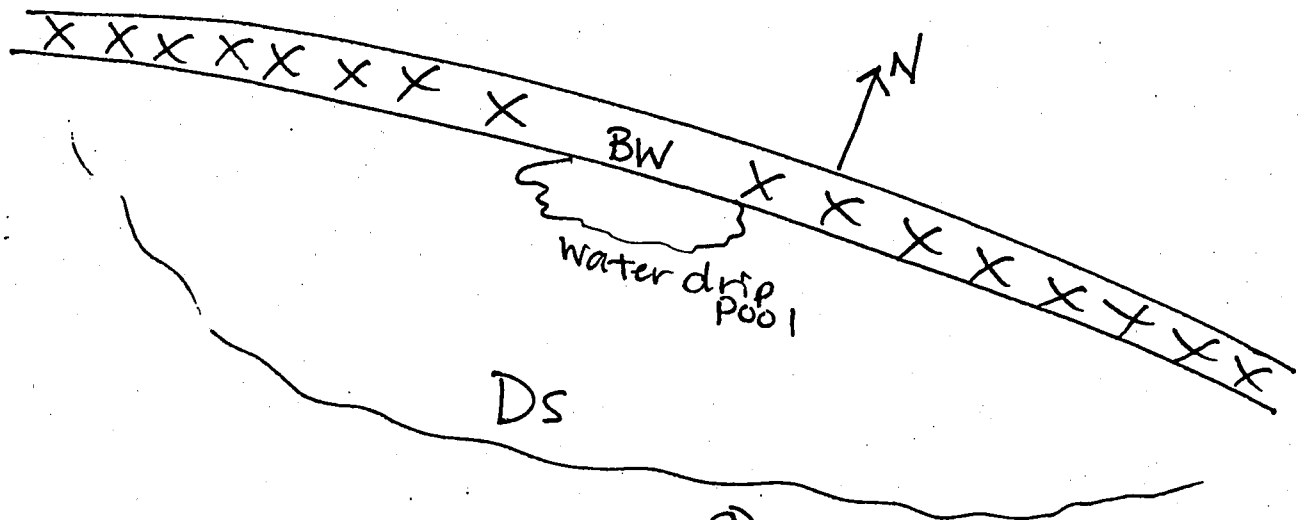
ca 1/4 mile up drainage from Freshwater Spring to East  
on N side where BW is well wetted



### HANGING GARDEN DATA SHEET

Investigator <i>JB</i>	Date <i>7/15/98</i>	Releve <i>ARCH-05-98</i>	Record	
Garden location <i>Arch up drainage to E of Freshwater Spring</i>	Aspect <i>200° mag. N.</i>	Geology <i>Entrada</i>	Size <i>small thin strip ~3-5m wide</i>	
UTM	Structure <i>Simple BW</i>	Elevation <i>~4400</i>	Water flow <i>1.5'</i>	Exposure <i>~2-5</i>
Distance from drainage				
Disturbance <i>very little -</i>				
Species	General	BW	DS	PP
<i>Mica</i>		<i>C</i>	<i>-</i>	
<i>Agave</i>		<i>U</i>	<i>C</i>	
<i>Aspl</i>		<i>-</i>	<i>O</i>	
<i>Susc</i>		<i>R</i>	<i>C</i>	
<i>Paoc</i>		<i>-</i>	<i>U</i>	
<i>Prop</i>		<i>U</i>	<i>R</i>	
<i>Epall</i>		<i>R</i>	<i>O</i>	
<i>Cit</i>		<i>U</i>	<i>U</i>	
<i>Caout</i>		<i>-</i>	<i>O</i>	
<i>Euphorbia brachycoma</i>		<i>-</i>	<i>O</i>	
<i>Hedera (Hedera)</i>		<i>-</i>	<i>R</i>	
<i>Castilleja exilis</i>		<i>R</i>	<i>R</i>	
<i>Juen</i>		<i>-</i>	<i>O</i>	
<i>*Agast</i>		<i>-</i>	<i>O</i>	
<i>Stfe</i>		<i>-</i>	<i>OR</i>	
<i>Sosp</i>		<i>-</i>	<i>O</i>	
<i>Rhbe</i>		<i>R</i>	<i>-</i>	

Ca 1/4 mile up drainage from Freshwater spring to East on N Side where BW is well wetted



**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <i>ARCH-05-98 above E of Freshwater Spring</i>		Date <i>7/15/98</i>	Workers <i>KVB</i>	
Site	Temperature	DO	Conductivity	pH
	<i>18.2°C</i>	<i>7.9mg/l</i>	<i>195.8µs/cm</i>	<i>8.20</i>

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
--	--	--	--	--	--	-----------------------	--	--	--

Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	83
								Feb	87
								Mar	82
								Apr	85
								May	78
								June	73
								Jul	73
								Aug	84
								Sep	87
								Oct	84
								Nov	85
								Dec	86

*not enough flow to measure*

*507  
480*

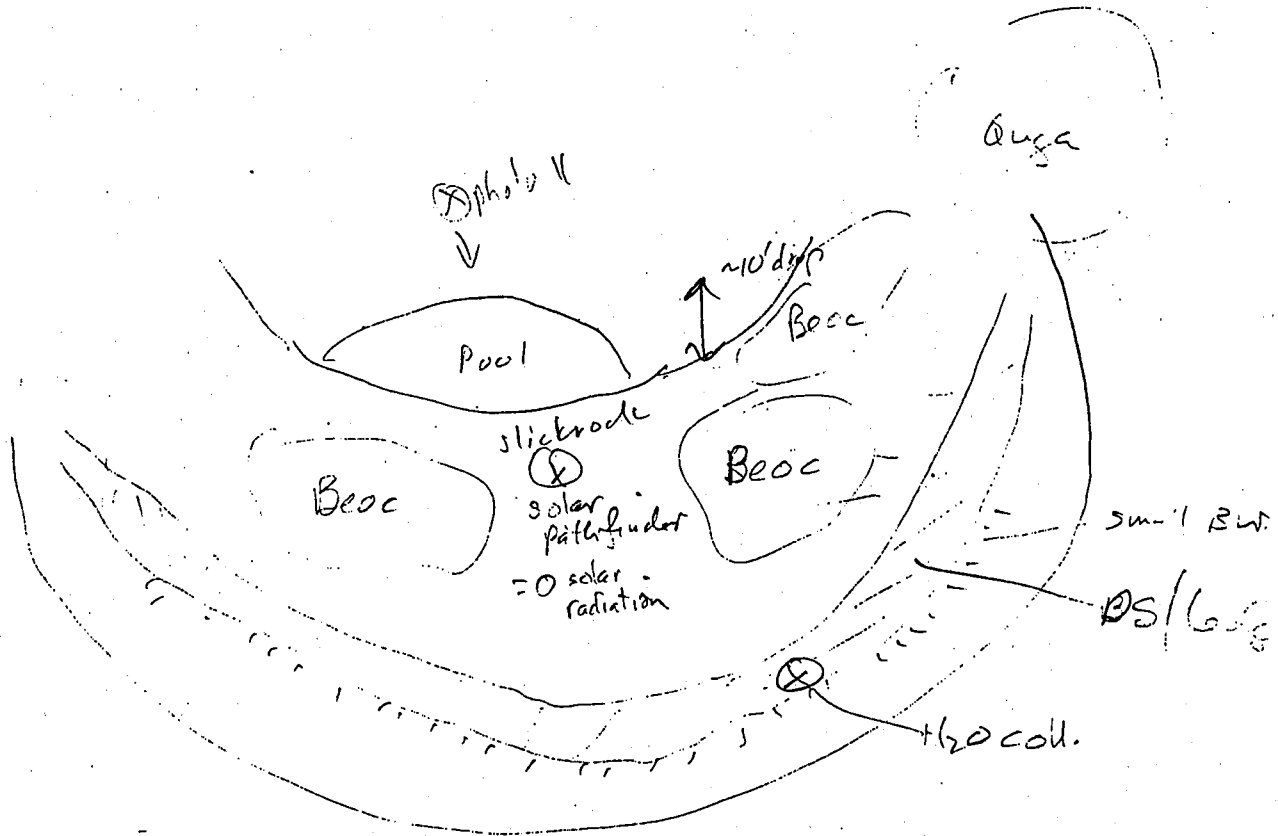


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GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SEP	Worker	TS
Location	CANY - Cabin Spring		
Topo Map		UTM	
Transect/Releve No.	CANY-01-98	Date	7/14/98

Sketches below and on back



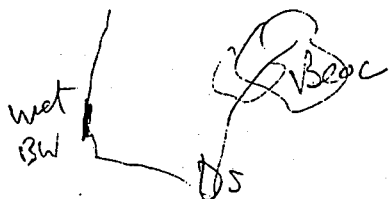
large slope

### HANGING GARDEN DATA SHEET

Investigator <span style="font-size: 1.5em;">JS</span>	Date 7/14/98	Releve CANV-01-98	Record
Garden location <span style="font-size: 1.5em;">Cabin Spring</span>	Aspect 280° wag N	Geology Nav- Kayenta	Size Small 30x10 m
UTM	Distance from drainage	Structure Young small gleone	Elevation 5400'
		Water flow 1.5	Exposure 4.0
Disturbance <span style="font-size: 1.5em;">deer, trampling, minor slumping</span>			
Species	General	BW	DS
Mica		u	-
HAZD >1000 plants		-	C
ZIVA >1000 plants		0	C
Rowo			0
Bzac			E
Carex di aurea (same as ARCH-0198)			0
Amal			R
Carex di hassei			u
Cose (ydr, plat, fruits)			u
Apca			0
Ami			u
Casc			0
SOSD			u
* Arst			-
* Plma			-
Pa...			-
Elymus sp. trachycaulis			R
* Soas			R
Epci			-

Species	General	BW	DS	PP
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat				
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
<b>Comments</b>				
<p>Zirva/Hezo very common!  lots of mosses  large old Beoc</p>				

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)



fluid fan

PP

shc

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

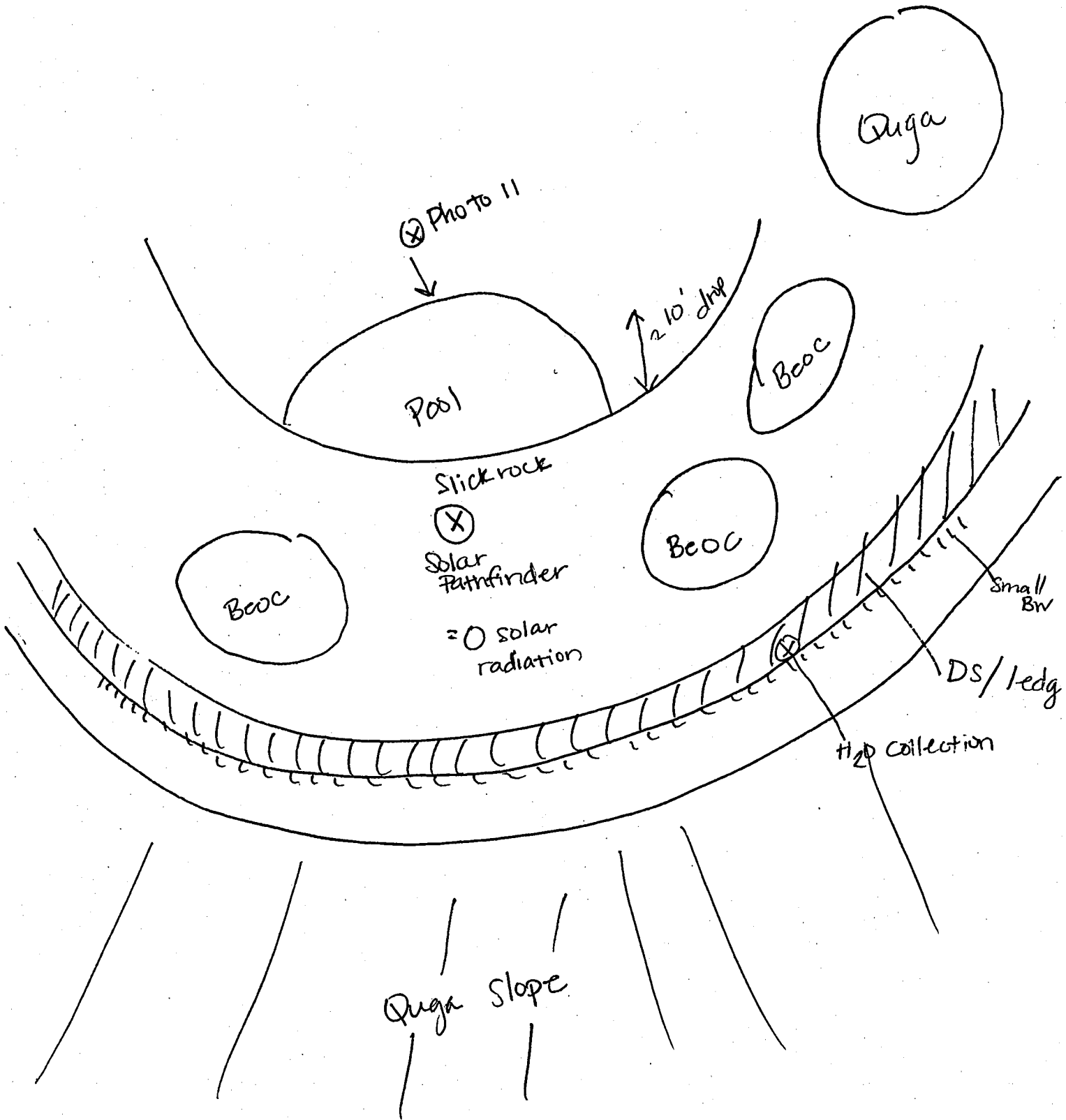
Site <i>CANY-01-98 Cabin Spring</i>		Date <i>7/14/98</i>	Workers <i>K3</i>	
Site	Temperature	DO	Conductivity	pH
	<i>15.6°C</i>	<i>7.0mg/l</i>	<i>243 µs/cm</i>	<i>7.99</i>

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data	
--	--	--	--	--	--	-----------------------	--

Volume (ml)	Time (sec)	Volume	Time	Volume	Time	Volume	Time	Month	%
<i>225</i>	<i>12.5</i>							Jan	<i>0</i>
<i>185</i>	<i>10.34</i>							Feb	<i>0</i>
<i>235</i>	<i>13.15</i>							Mar	<i>0</i>
<i>240</i>	<i>13.0</i>							Apr	<i>0</i>
<i>265</i>	<i>14.53</i>							May	<i>0</i>
								June	<i>0</i>
								Jul	<i>0</i>
								Aug	<i>0</i>
								Sep	<i>0</i>
								Oct	<i>0</i>
								Nov	<i>0</i>
								Dec	<i>0</i>

*~99% of flow captured*

$$Q = 18.1 + 1\% = 18.3 \text{ ml/sec}$$

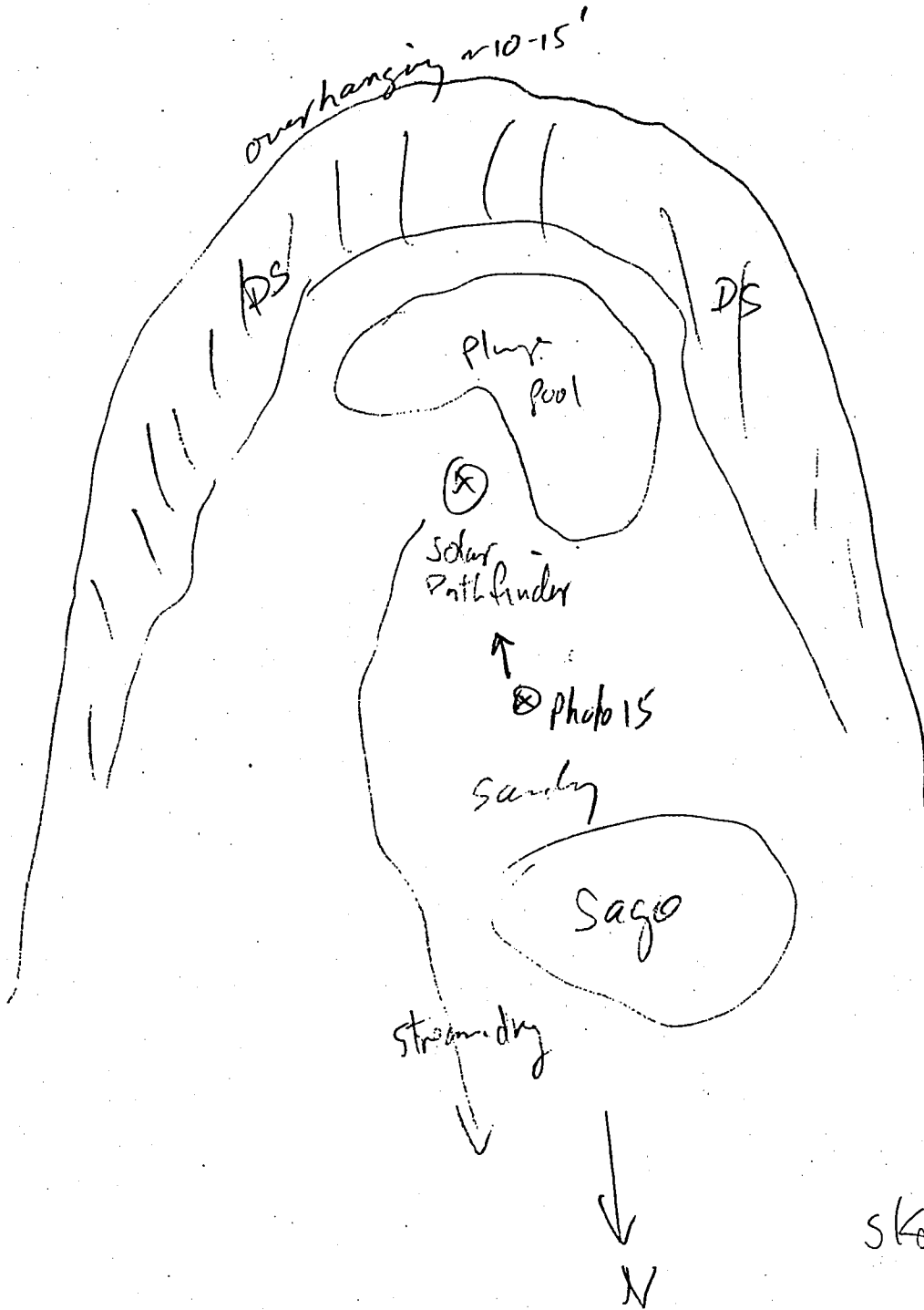


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GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	PS
Location	CANY- Big Springs, ca 100' downstream from trail		
Topo Map	UTM		
Transect/Releve No.	CANY-02-98	Date	7/15/98

Sketches below and on back



### HANGING GARDEN DATA SHEET

Investigator <span style="font-size: 2em;">JS</span>	Date 7/15/98	Releve CFNY-02-98	Record	
Garden location  UTH <span style="font-size: 1.5em;">Big Springs</span>	Aspect 350° mag N	Geology ? Nav-K	Size Small 20m x 5m	
Distance from drainage in drainage	Structure simple backwall	Elevation 4650'	Water flow 2-0	
Exposure 4.5				
Disturbance <span style="font-size: 1.2em;">rockfall, recreation (trampling)</span>				
Species	General	BW	DS	PP
<i>Adria</i>		C	O	—
term. spikes $\rightarrow$ <i>Carex cf. hassii</i>		<del>C</del> R	O	—
<i>Auca</i>		—	U	O
<i>Agmi</i>		U	U	—
<i>Epgi</i>		O	U	—
<i>Fpau</i>		—	R	—
<i>Phan</i>		—	O	O
<i>Oxuc</i>		—	U	O
<i>Rhbe</i>		—	R	—
<i>Elca</i>		—	O	O
<i>Caau</i>		O	O	—
<i>Egny</i>		—	R	U
<i>Brio</i>		—	R	O
<i>Deel</i>		—	R	—
<i>Clli</i>		—	O	O
* <i>Taof</i>		—	R	O
<i>Tuba</i>		—	R	C
* <i>Agst</i>		—	—	O
<i>Pdfr</i>		—	—	U
<i>Pativir</i>		—	R	O
<i>Sago</i>		—	—	C

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <i>CANY-02-48 Big Springs Canyon</i>		Date <i>7/15/98</i>	Workers <i>KB</i>	
Site	Temperature	DO	Conductivity	pH
	<i>16.8°C</i>	<i>7.6 mg/l</i>	<i>508 μS/cm</i>	<i>7.78</i>

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
<i>175</i>	<i>8.97</i>							<i>Jan</i>	<i>0</i>
<i>140</i>	<i>11.19</i>							<i>Feb</i>	<i>0</i>
<i>150</i>	<i>9.43</i>							<i>Mar</i>	<i>0</i>
<i>130</i>	<i>9.03</i>							<i>Apr</i>	<i>19</i>
<i>185</i>	<i>11.53</i>							<i>May</i>	<i>46</i>
<i>140</i>	<i>9.10</i>							<i>June</i>	<i>51</i>
								<i>Jul</i>	<i>51</i>
								<i>Aug</i>	<i>18</i>
								<i>Sep</i>	<i>0</i>
								<i>Oct</i>	<i>0</i>
								<i>Nov</i>	<i>0</i>
								<i>Dec</i>	<i>0</i>

*~95% of flow captured*

$$Q = 15.6 + 5\% = 16.4 \text{ m}^3/\text{sec}$$



**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site CANY-03-98 Cave Springs Date 7/15/98 Workers KTB

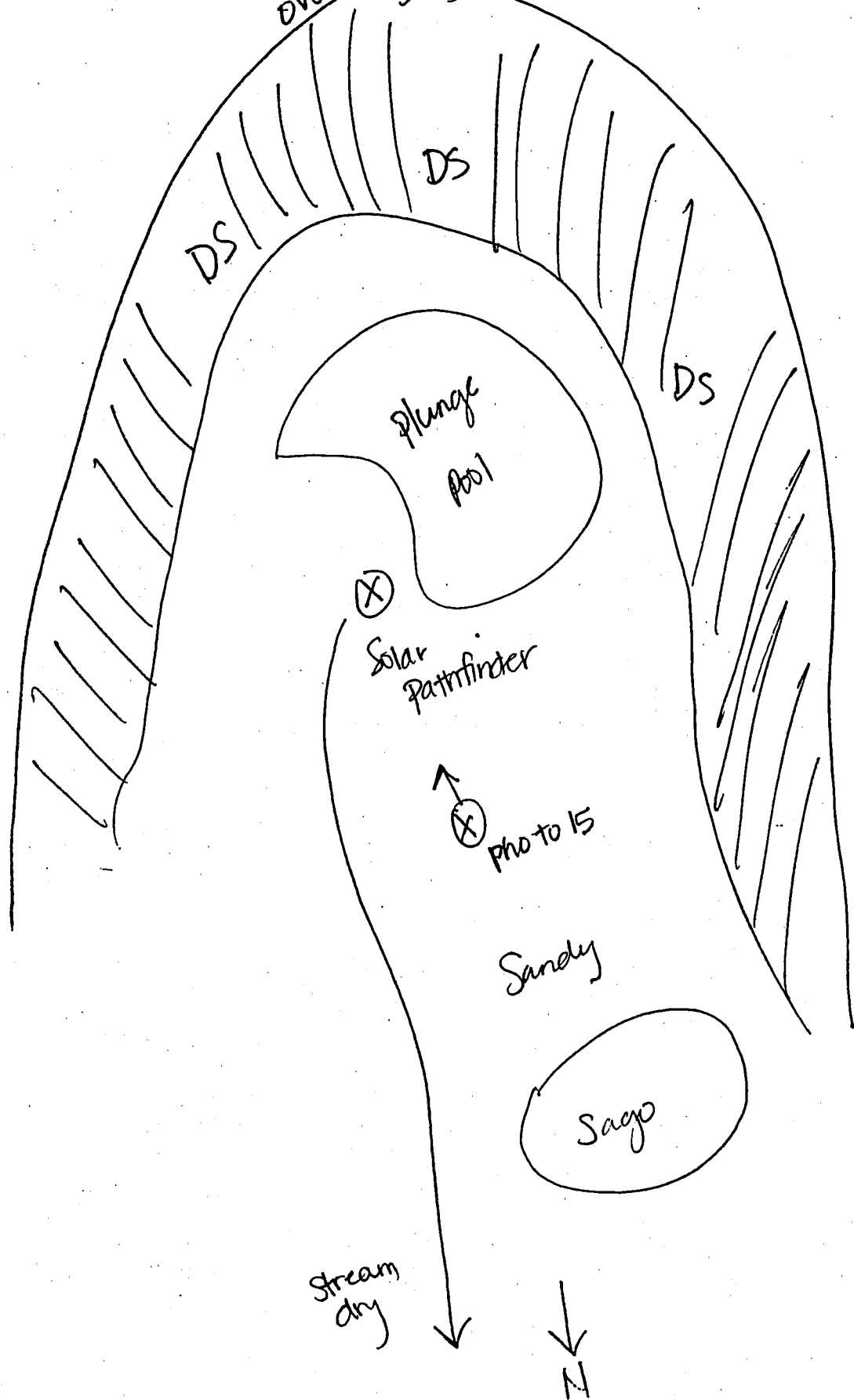
Site	Temperature	DO	Conductivity	pH
	17.6C	5.2mg/l	304 us/cm	8.22
			5000' de	

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
--	--	--	--	--	--	-----------------------	--	--	--

Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
<u>no flow</u>								Jan	13
<u>estimated</u>								Feb	10
<u>(too low)</u>								Mar	5
								Apr	0
								May	0
								June	0
								Jul	0
								Aug	0
								Sep	2
								Oct	10
								Nov	12
								Dec	11

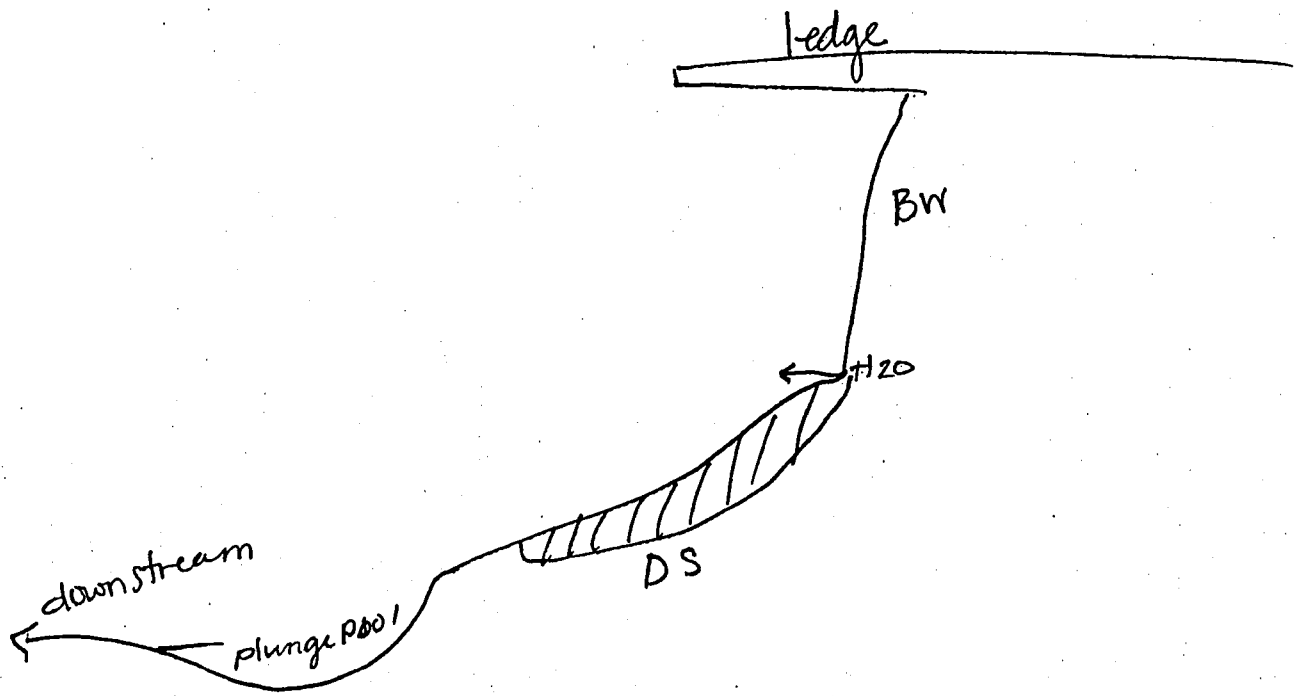
Plants - some Gymnostomum calcareum Hymenostylium recurvirostrum  
 & Adca - u

Overhanging ~10-15'



CANY-02-98

Big Springs



# Sketch of GLCA-01-97

Vegetation

water flow over cliff band

rock band

H<sub>2</sub>O coll. site  
under overhang

Phan

City

Cere

cliff

dry ledges

① dispersed flow  
fairly heavy

③ lower flow

② heaviest flow  
under boulder

lake  
ele 3685'

⊗ photo from  
Vessel 321



**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	SSP	Worker	JS/HT/VW
Location	Death Camas Garden		
Topo Map	UTM 12-511460E 4116600N		
Transect/Releve No.	6LCA01-97	Date	6/18/97

Sketches below and on back

Water - site 1

Water Temp -  
Kawins Notebook

measured

1	228 ml	1.78 sec
2	255 ml	2.21 "
3	244 ml	2.34 "
4	249 ml	2.21 "
5	172 ml	1.46 ( <del>*not seen</del> )
6	272 ml	2.40 "
7	256 ml	2.17 "
8	243 ml	2.15 "

$\bar{x} = 239.9$       2.09  
 (= 6887.1 / minute)

site 2

	ml	SEC
1	233 + 226 + 230 238 + 245 + 254	16.25
2	234 + 242 + 216 + 205 + 247 + 236	16.40
	477 = 1427	

$\bar{x} = 1434.5$       16.32  
 = 5273.9 ml/minute

Site 3 = ~10% of Site 2 (low)  
 see sketches on back

Total = 6.89 + 5.27 + 0.53 = 12.69 / minute

= 2115 ml/sec

Notes: no pools of water, diffuse flow

Geology: top and upper 10cm of kyogita (below Navajo)

Color Pathfinder

Jan	70	July	50
Feb	64	Aug	54
Mar	61	Sep	61
Apr	56	Oct	62
May	50	Nov	66

$\bar{x}$  (overall) = 59.3

$\bar{x}$  (summer) = 53.5

$\bar{x}$  (winter) = 65.2

additions  
6/18/97 on back

### HANGING GARDEN DATA SHEET

Investigator JB	Date 081696	Releve SJA 13	Record 1
Garden location Death Camas Garden aka Welsh 1989 (Pofr tree)	Aspect 125°	Geology	Size
Distance from drainage	Structure terrace 6. shallow clay + soil + cl.	Elevation	Water flow 4.0
Disturbance lower edge trimmed by lake  mixed soil-ledge			
Species	General	BW	DS
CASC	✓		U
Cirg	✓		C
Spai	✓		O
Caru	✓		<del>A</del> C
Arca	✓		U
Paeo	✓		O
Angl	✓		C
Josp	✓		U
Ceoc	✓		R
Phan	✓		<del>A</del> U
Elca	✓		R
Brto	✓		R
Cere	✓		-
Pern	✓		O dryish Bm
Cali	✓		R
Baem	✓		-
Pofr	✓		-
Laca	✓		R
Jonu	✓		O
Stto	✓		-
Arw	✓		-
Tese			-

Muhl. sp/4wms Muan

⊙

GLCA01-97

GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA

Site <i>Death Canyon border - San Juan Area</i>		Date <i>6/18/97</i>	Workers <i>TS/KB/AT</i>	
Site	Temperature	DO	Conductivity	pH
<i>(X) Sample coll. site</i>	<i>20.5</i>	<i>6.5</i>	<i>177.2</i>	<i>7.36</i>

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
<i>(site)</i> Volume (ml)	Time (Sec)	Volume	Time	<i>(site 2)</i> Volume	Time	Volume	Time	Month	%
<i>228</i>	<i>1.78</i>			<i>1442</i>	<i>16.25</i>	<i>88.7</i>		Jan	<i>70</i>
<i>255</i>	<i>2.21</i>			<i>1427</i>	<i>16.40</i>	<i>97.0</i>		Feb	<i>64</i>
<i>244</i>	<i>2.34</i>							Mar	<i>61</i>
<i>249</i>	<i>2.21</i>							Apr	<i>56</i>
<i>172</i>	<i>1.46</i>			<i>(2) = 87.9 ml/sec</i>				May	<i>50</i>
<i>272</i>	<i>2.40</i>							June	<i>50</i>
<i>256</i>	<i>2.17</i>							Jul	<i>50</i>
<i>243</i>	<i>2.15</i>							Aug	<i>54</i>
								Sep	<i>61</i>
<i>239.9</i>	<i>2.09</i>							Oct	<i>62</i>
<i>(1) = 114.8 ml/sec</i>								Nov	<i>66</i>
								Dec	<i>68</i>

+10% of (1) =

*214.2 ml/sec discharge*

$\bar{X}$  (overall) = *59.3*  
 $\bar{X}$  (Mar → Aug) = *53.5*  
 $\bar{X}$  (Sept → Feb) = *65.1*

**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project <i>Spring</i>	Worker <i>JS</i>
Location <i>GLCA0297 Granddaddy Garden</i>	
Topo Map	UTM <i>12-514300E 4123 510 N</i>
Transect/Releve No.	Date <i>19 Jun 97 1115</i>

Sketches below and on back

ml	SEC
<del>200</del>	<del>2.31</del>
222	3.16 70
248	3.28 76
251	3.63 65
234	3.63 65
228	3.50 65.1
234	3.60 65
238	3.82 62

(+ 10% for a smaller area)

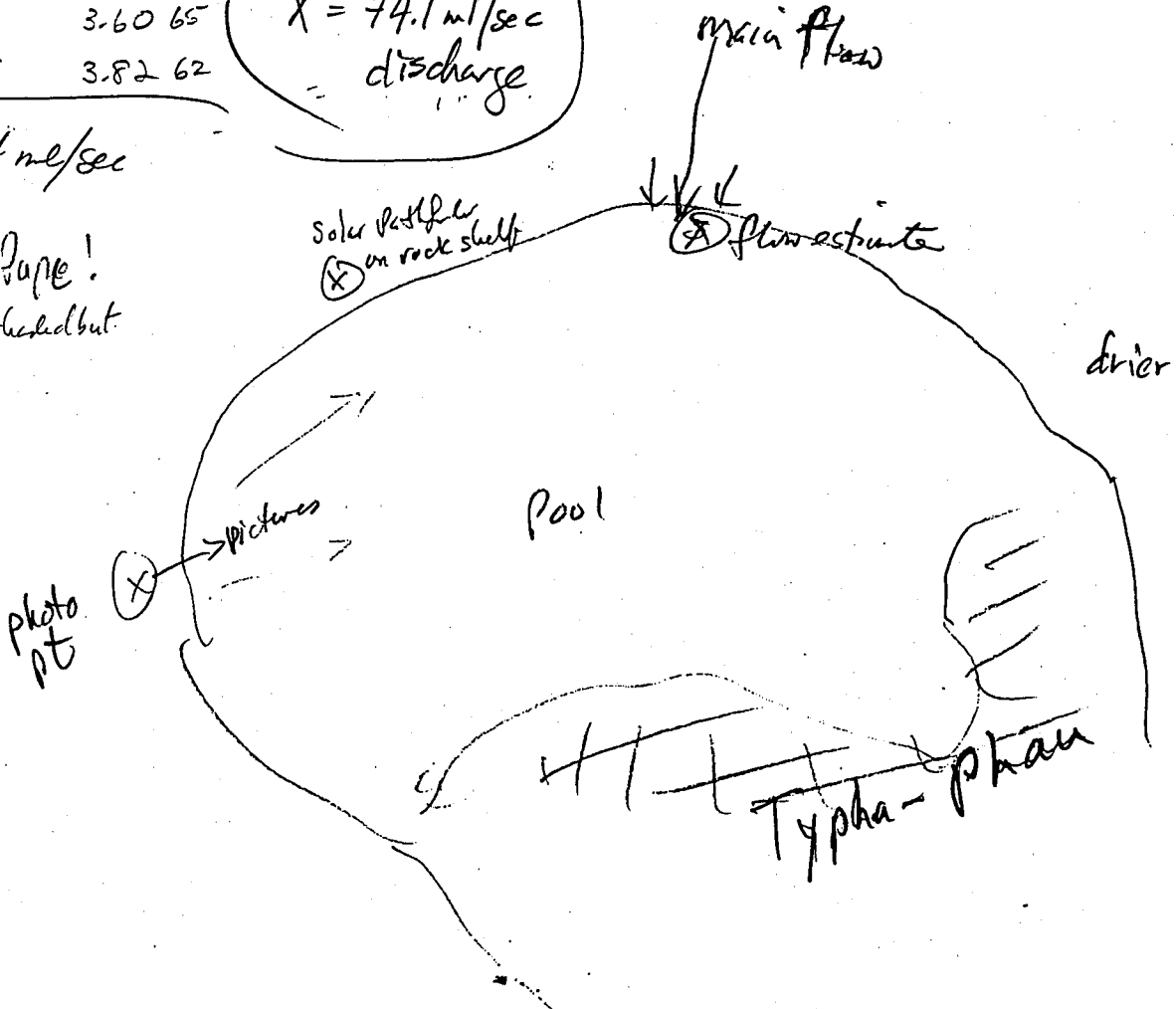
Water T = 19.0 °C

overall flow

$\bar{X} = 74.1 \text{ ml/sec}$   
discharge

67.4 ml/sec

Noted tape!  
on cliff-shaded but  
fairly dry





FLORA SURVEY DATA SHEET  
 GLEN CANYON NATIONAL RECREATION AREA

LOCATION Ribbon Canyon - "Grand-daddy"

hanging garden - on N side of canyon

OBSERVER JS DATE 6-8-92

WEATHER \_\_\_\_\_

VEGETATION complex - 5 relevés read

NOTES a very large garden - see sketch on back -

deer sign common on DS -

note alluvium forming dam of pool - species on

it not included in list of H6 plants

SPECIES

<del>#</del> <i>Schizochrium scoparium</i>	<i>Panicum penn.</i>
<i>Yucca cf. taylorae</i>	
<i>Solidago sparsiflora</i>	
<i>Phragmites australis</i>	
<i>Rhus aromatica</i>	
<i>Celtis reticulata</i>	
<i>Quercus gambelii</i>	
<i>Calamagrostis scopulorum</i>	
<i>Apocynum cannabinum</i>	
<i>Cirsium rydbergii</i>	
<i>Muhlenbergia thurberi</i>	
<i>Rosa woodsii</i>	
<i>Aquilegia microantha</i>	
* <i>Eleocharis</i> sp. -	<i>E. rostellata</i>
<i>Adiantum capillus-veneris</i>	
<i>Zigadenus virgatus</i>	
<i>Carex curatorum</i>	
<i>Epipactis gigantea</i>	
<i>Sonchus asper</i>	
<i>Bromus tectorum</i>	
<i>Typha domingensis</i> (cf.)	
<i>Stephanomeria tenuifolia</i>	
<i>Panicum virgatum</i>	
<i>Thelypodium integrifolium</i>	
<i>Baccharis salicina</i>	
<i>Panicum acuminatum</i>	
<i>Juncus arcticus</i>	
<i>Petrophytum caespitosum</i>	

RIPARIAN SURVEY-GLEN CANYON NATIONAL RECREATION AREA

Location Ribbon Canyon

Site H6-06 Date \_\_\_\_\_ Observers \_\_\_\_\_

Elevation \_\_\_\_\_ Aspect 165° Geology NK

Stream Classification \_\_\_\_\_ Water flow FR=3 in middle (we)

Disturbance some rock fall

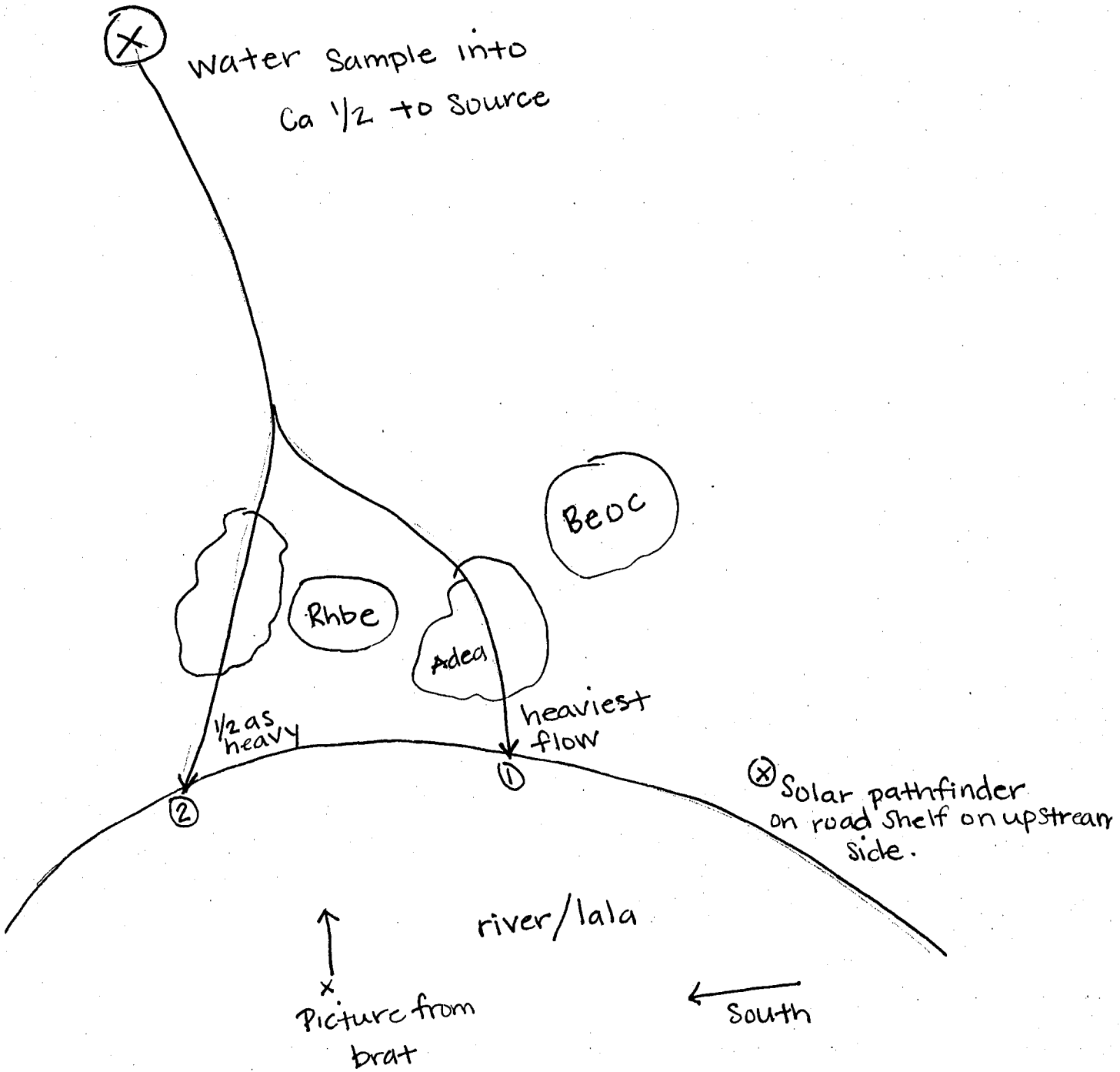
Community classification/description Distinct PP/BW/DS, + upper DS ledge not studied

Species	<sup>Record 6</sup>						
	BW	DS	PP		BW	DS	PP
1 <u>Ciry</u>	U	U	-	16 <u>Ascf</u>	O	O	-
2 <u>Cacu</u>	C	O	-	17 <u>Miea</u>	U	-	-
3 <u>Elca</u>	-	O	O	18 <u>Juar</u>	-	U	C
4 <u>Phen</u>	-	U	O	19 <u>Paac</u>	R	R	O
5 <u>Soas</u>	-	O	R	20 <u>Tyla</u>	-	-	O
6 <u>Cere</u>	R	U	-	21 <u>Brte</u>	-	-	O
7 <u>Ouga</u>	-	U	-	22 <u>Potomasetan</u>	-	-	O
8 <u>Smst</u>	-	O	-	23 <u>Zinnibellia</u>			
9 <u>Epig</u>	-	R	-	24			
10 <u>Yucca sp.</u>	-	O	-	25			
11 <u>Brlo</u>	O	U	U	26			
12 <u>Muan</u>	O	O	-	27			
13 <u>Adca</u>	O	O	-	28			
14 <u>Eg hy</u>	-	C	A	29			
15 <u>CASC</u>	U	O	-	30			


Abundance (A=95-100%; D=50-95%; C=10-50%; U=1-10%; O=<1%; R=<<1%)  
 Sociability (1=even; 2=random; 3=patchy; 4=very patchy)  
 s=sexual-flowering; v=vegetative Notation: Ceoc (3-4)sC-3

Notes: PP - sand + silt dam sand pool was surveyed

GLCA 03 97  
Esclante Arm



GLCA RIPARIAN VEGETATION DATA FORM 1

Map 	Location U. Escalante - 2a 2/3 mi. below Coyote - on RR	Date 7/15/97	Observers JS
UTM 12- 501700E 4140840 N		Relevé GLCA03-97	Elevation 3700'
Geomorphology Kayenta - (wetter)			
Aspect 50	Substrate	Terrace	PFI
Exposure	Water	Canyon D	Canyon W
Geology mostly DS with small siltstone areas - more spring like than H6-like			
Disturbance Slumpage			
Code	Species	Prominence	Collection
1	Sosp 2		
2	Beoc 5		
3	Rovo 4		
4	Adca 4		
5	Casc 3		
6	Rhbe 3		
7	Epgi 3		
8	Cacu 2		
9	Baem		
10	Sax lower edge in river		
11	Phar		
12	Molal 2		
13	Castilleja exilis 1		
14	Ciar 2		
15			

**GLCA RIPARIAN VEGETATION DATA FORM 2**

Code	Species	Prominence	Collection
16	Thin 1		
17	Arb 2		
18	Ruyn 3		
19	Tory 2		
20			
21			
22			
23			
24			
25			
Stratum	Height	Cover	
Tree	3-6 m		
Shrub			
Graminoid			
Forb			
Bryophyte			
Lichen			
Litter			
Soil			
Rock			
Notes			

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <u>GLCA03-97 upper Escalante</u>		Date <u>7/15/97</u>	Workers <u>JS+</u>
Site	Temperature	DO	Conductivity
nearest source	<u>16°C (hand-held)</u>	-	-
Corning Jet	<u>18.9°</u>	<u>6.8 mg/l</u>	<u>171.5 <math>\mu</math>scm</u>

Water Flow Data (place unit of measurement below Volume)	Solar Pathfinder Data
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Volume ml (1)	Time sec	Volume (1)	Time	Volume (2)	Time	Volume (2)	Time	Month	%
<u>248+</u>	<u>7.41</u>	<u>240+</u>	<u>4.35</u>	<u>198</u>	<u>2.91</u>			Jan	0
<u>242+</u>		<u>242+</u>		<u>239</u>	<u>3.81</u>			Feb	25
<u>240+</u>		<u>247+</u>		<u>233</u>	<u>3.59</u>			Mar	45
<u>239+</u>		<u>244+</u>		<u>250</u>	<u>3.81</u>			Apr	61
<u>243+</u>		<u>210</u>		<u>238</u>	<u>3.16</u>	<u>discarded</u>		May	66
<u>245+</u>		<u>1183</u>						June	71
<u>221+</u>				<u>68/sec</u>				Jul	71
<u>64+</u>				<u>63/sec</u>				Aug	65
<u>198</u>				<u>65/sec</u>				Sep	45
<u>1940</u>				<u>66/sec</u>				Oct	36
								Nov	0
								Dec	0

①

+ 5% at (1)  
+ 5% at (2)

① 262/sec  
272/sec

W 106  
S 379

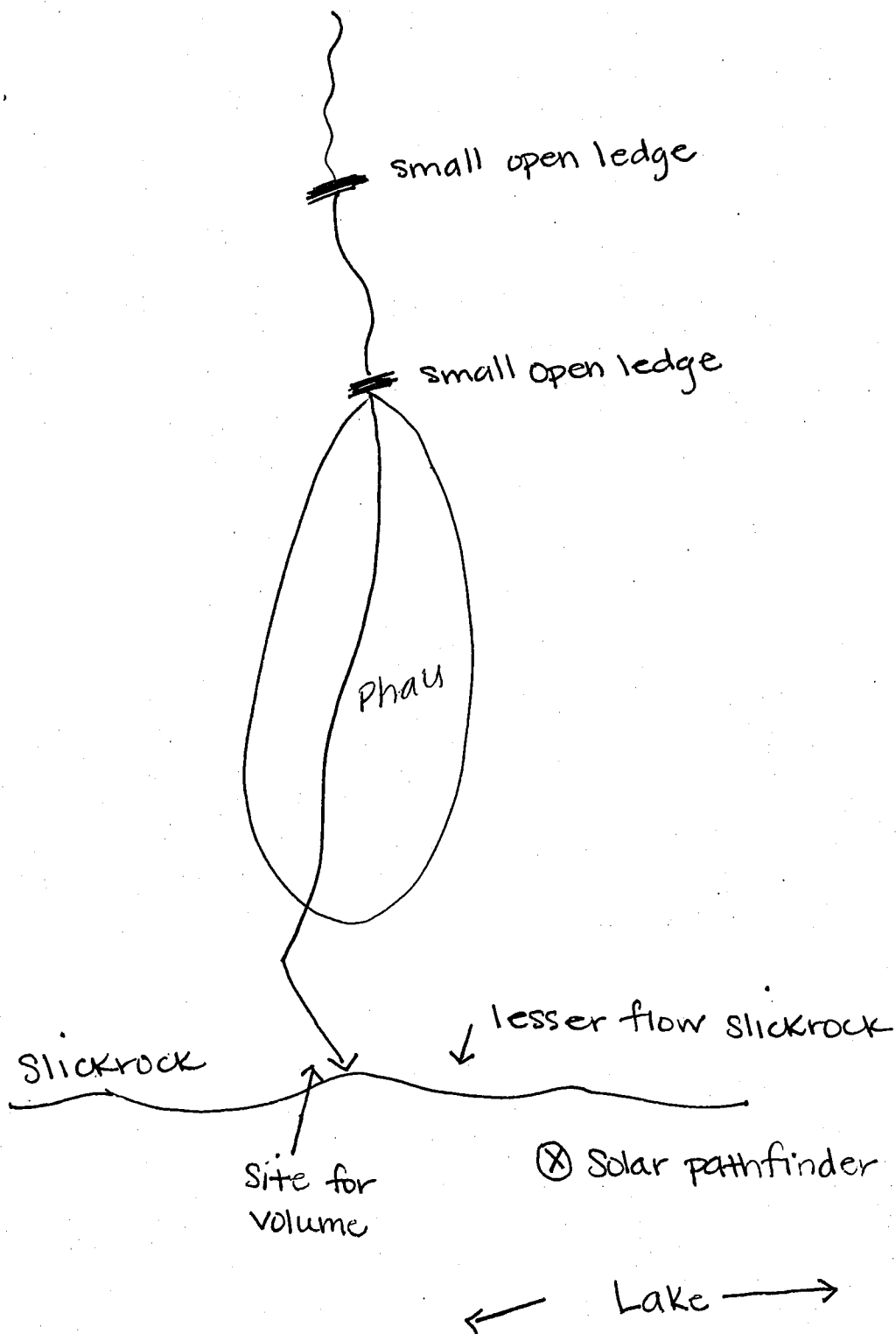
$$\bar{X}(1) = 267 \text{ ml/sec } (N=2) (+ 5\%) = 280 \text{ ml/sec}$$

$$\bar{X}(2) = 60 \text{ ml/sec } (N=4) (+ 5\%) = 69 \text{ ml/sec}$$

discharge = 349 ml/sec

GLCA 04-97  
Escalante Arm

(X) under overhang  
water supply



GLCA RIPARIAN VEGETATION DATA FORM 1

Map	Location Escalante - on L side down from site 03	Date 7/15/87	Observers JS
UTM 12 - 502660 E 4140860 N		Releve 6LCA04A7	Elevation
Geomorphology sloping bottom of wungate - some wungate exposed			
Aspect 250° mag	Substrate	Terrace	PFI
Exposure	Water 4.0	Canyon D	Canyon W
Geology			
Disturbance			
Code	Species	Prominence	Collection
1	Phau	5	
2	Parvit	3	
3	ClIi	3	
4	Sosp	3	
5	Ciry	2	
6	Ephi	2	
7	Carex spp. anrea/hassen type	2	
8	Paec	3	
9	Adca	2	
10	Brte	2	
11	Torn	2	
12	Ayba	2	
13	Thin	1	
14	Elca	1	
15	Rhar (tr)	2	

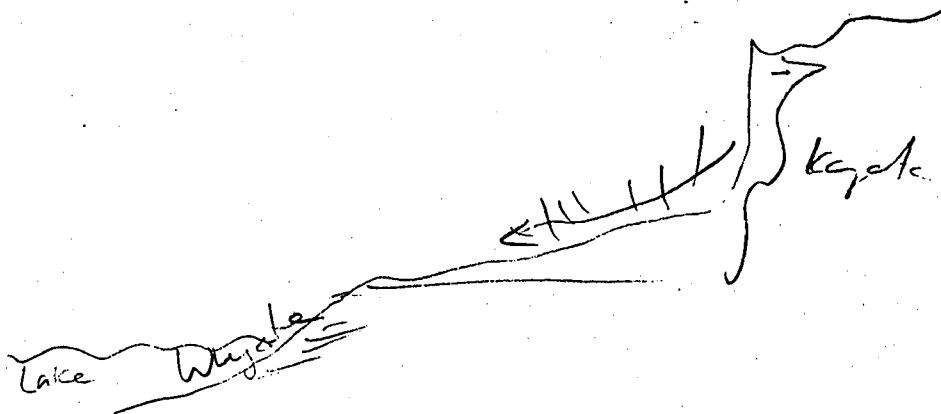


GLCA RIPARIAN VEGETATION DATA FORM 2

Code	Species	Prominence	Collection
16	Carya	2	
17	<del>Q. vel</del> Q. vel	2	
18	Coccoloba	3	
19	B. ca	2	
20	Amel	2	
21	Juncus	2	
22	Caen	1	
23	<del>Prosopis</del> Prosopis - small w/ll	R 1	
24	L. ca	R 1	
25			

Stratum	Height	Cover
Tree		
Shrub		
Graminoid		
Forb		
Bryophyte		
Lichen		
Litter		
Soil		
Rock		

Notes



**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <u>GLCA97-04 04-93</u>		Date <u>7/5/97</u>	Workers <u>JS</u>
Site	Temperature	DO	Conductivity
(Dofl) W	21°C - handheld Therm. (lost thermometer - may be at cliff)	—	—
Corning Inst.	23°C	—	182.1 μs/cm
			7.78

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
--	--	--	--	--	--	-----------------------	--	--	--

Volume (ml)	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
248	6.28	252	6.35					Jan	70
246		250						Feb	71
250		238						Mar	71
246		248						Apr	83
250		250						May	87
250		250						June	87
250		240						Jul	87
244		194						Aug	87
<del>1984</del>		<del>1922</del>						Sep	83
								Oct	69
$\bar{x} = 315.9$		302.7						Nov	68
								Dec	70

(+ 10% of flow)

$$309.3 + 10\% = 340.2 \text{ ml/sec}$$

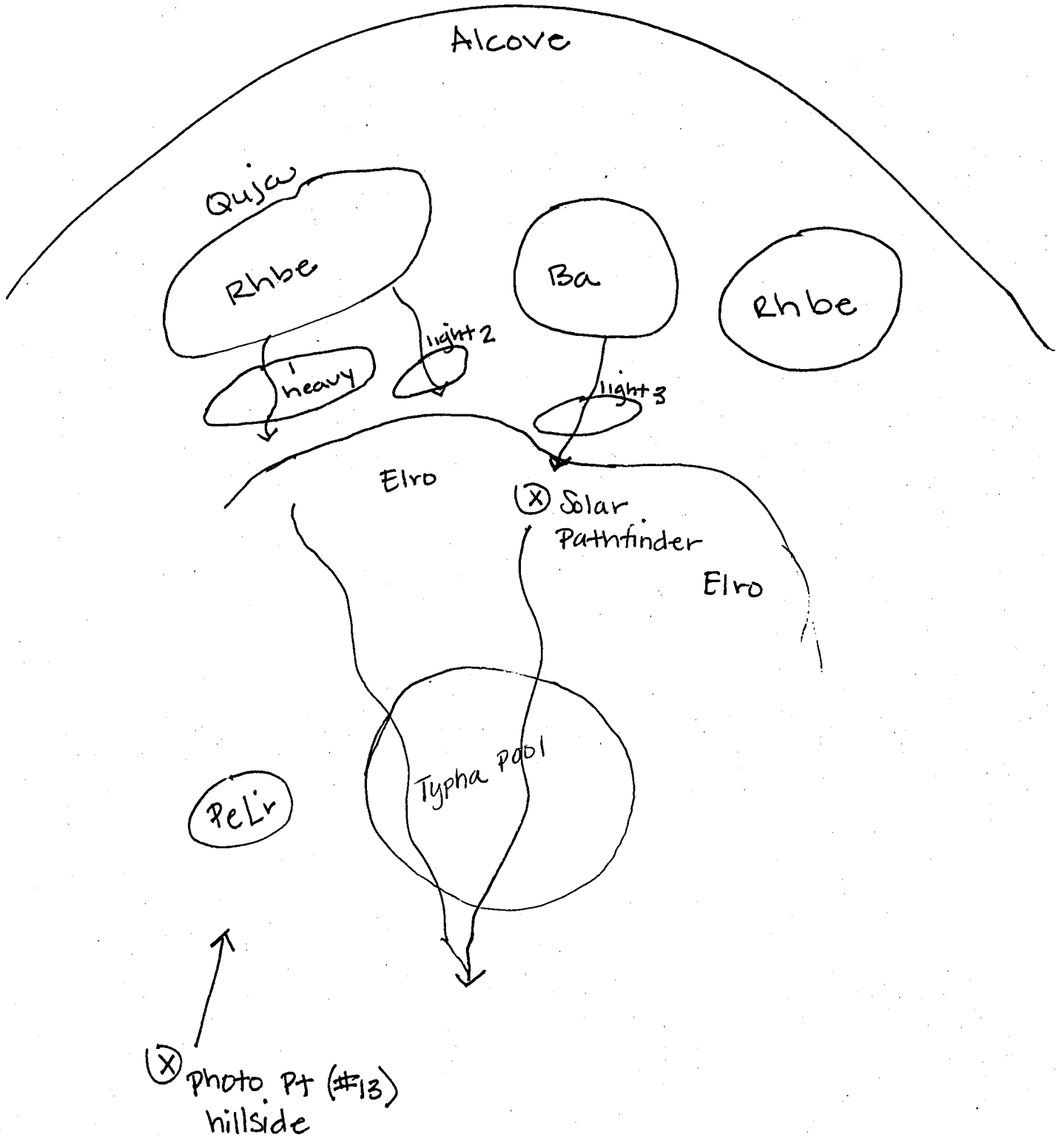
$$\text{March} \rightarrow \text{Aug} = 83.7 \pm 6.4$$

$$\text{Sept} \rightarrow \text{Feb} = 71.8 \pm 5.6$$

$$\text{year} = 77.8 \pm 8.4$$

GLCA 05-97

Long Canyon



### HANGING GARDEN DATA SHEET

Investigator <b>JB</b>	Date <b>7/16/97</b>	Releve <b>GLCAOS-97</b>	Record	
Garden location  <b>Long Canyon</b>  UTM <b>14T Long 37°45.02' N</b>	Aspect  <b>120°</b>	Geology  <b>Nav-key interface</b>	Size  <b>300m<sup>2</sup></b>	
Distance from drainage <b>110° 24.87' W</b>	Structure <b>DS</b>	Elevation <b>4100'</b>	Water flow <b>4.0</b>	
Exposure <b>3.5</b>				
Disturbance				
Species	General	BW	DS	PP
Rhbe			C	-
Adca			O	-
Poac			O	-
Elro			U	A
DasC			O	O
Caan			O	O
Phau			O	O
Quca			R	-
Tory			O	R
ScSc			R	-
Baem			R	R
Soca			-	O
Pofr			-	R
Scpa			-	O
Typha inter. spikas - light Br.			-	O
Dabl			R	R
Loca			R	-
Juba			-	O
Juen			-	O
Ooel			-	R
Pot. of Pot. (pool)			-	O

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <i>6LCA05-97 Long Canyon</i>		Date <i>7/16/97</i>	Workers <i>JS</i>
Site	Temperature	DO	Conductivity
	<i>19.0 °C</i>	<i>7.4 mg/l</i>	<i>142.2 μs/cm</i>

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
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Volume <i>(1) ml</i>	Time <i>secs</i>	Volume	Time	Volume <i>(2)</i>	Time	Volume	Time	Month	%
<i>1a</i>	<i>6.82</i>			<i>222</i>	<i>6.72</i>			Jan	<i>61</i>
				<i>234</i>	<i>6.91</i>			Feb	<i>58</i>
<i>1b</i>	<i>6.00</i>			<i>228</i>	<i>6.84</i>			Mar	<i>61</i>
								Apr	<i>56</i>
								May	<i>53</i>
				<i>33/sec</i>				June	<i>53</i>
				<i>33.9/sec</i>				Jul	<i>53</i>
				<i>33.3/sec</i>				Aug	<i>54</i>
								Sep	<i>59</i>
								Oct	<i>57</i>
								Nov	<i>59</i>
								Dec	<i>50</i>

*1a*  $246 + 248 + 234 + 240$   
 $240 + 238 + 243 + 217 + 143$   


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*300.4 ml/sec*

*1b*  $238 + 240 + 240 + 241 +$   
 $243 + 244 + 174 + 106$   


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*287.7 ml/sec*

$\bar{X}(1) = 294 \text{ ml/sec}$

$\bar{X}(2) = 33.4 \text{ ml/sec}$

$\left. \begin{array}{l} \bar{X}(1) = 294 \text{ ml/sec} \\ \bar{X}(2) = 33.4 \text{ ml/sec} \end{array} \right\} = 327.4 \text{ ml/sec} + 5\% = 343.8 \text{ ml/sec}$

$1 = 90\%$   
 $(2 = \sim 5\%)$

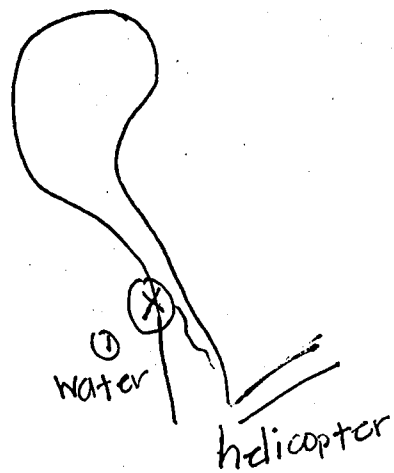
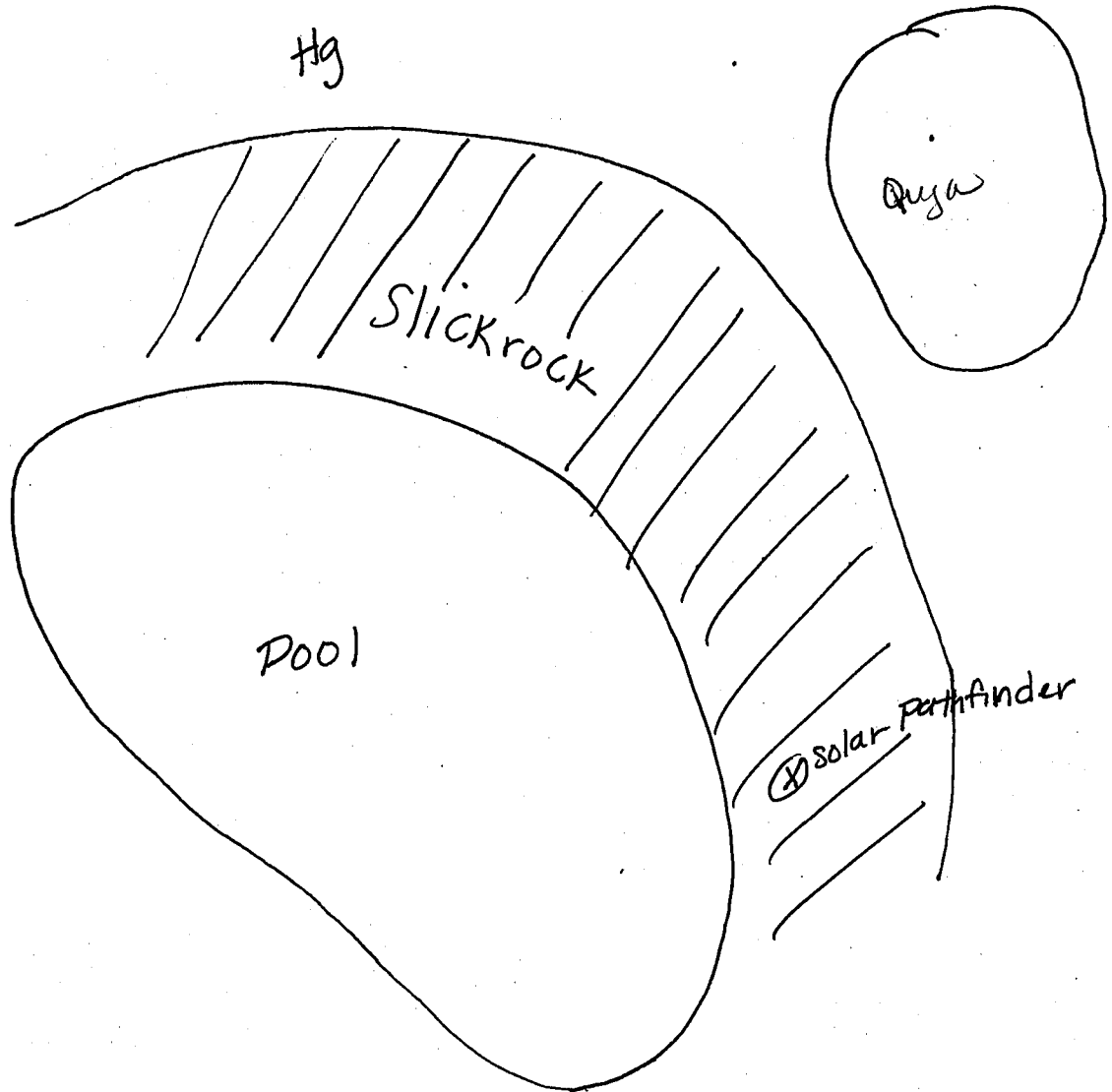
*3/others = +5%*  
*(add 5% to overall total)*

*noted Red-spotted Trout adult + tadpoles*

*Mar-Aug = 55±*  
*Sep-Feb = 57.3±*  
*Year = 56.2±*

GLAC 06-97

Burns Canyon



### HANGING GARDEN DATA SHEET

Investigator <i>SS</i>	Date <i>7/16/97</i>	Releve <i>GLCA0697</i>	Record	
Garden location  <i>Borings Canyon - west/left fork at end</i>	Aspect  <i>240° mag</i>	Geology  <i>Nav</i>	Size  <i>large</i> <i>1500m<sup>2</sup></i> <i>by</i> <i>1000m<sup>2</sup></i>	
UTM <i>12-51160E 4138810N</i>	Structure  <i>classic alone</i>	Elevation	Water flow  <i>3.5</i>	Exposure  <i>4</i>
Distance from drainage  <i>is</i>	Disturbance  <i>slips, rock free</i>			
Species	General	BW	DS	PP
<i>Cacu</i>		<i>0</i>	<i>C</i>	<i>-</i>
<i>Ciry</i>		<i>R</i>	<i>C</i>	<i>-</i>
<i>Ardea</i>		<i>0</i>	<i>C</i>	<i>-</i>
<i>Poac</i>		<i>-</i>	<i>0</i>	<i>R</i>
<i>Aqui</i>		<i>0</i>	<i>U</i>	<i>-</i>
<i>Pksp</i>		<i>U</i>	<i>0</i>	<i>-</i>
<i>Sach</i>		<i>-</i>	<i>U</i>	<i>-</i>
<i>Rhiz</i>		<i>-</i>	<i>R</i>	<i>0</i>
<i>Balm</i>		<i>-</i>	<i>R</i>	<i>0</i>
<i>Epi</i>		<i>0</i>	<i>0</i>	<i>-</i>
<i>Angl</i>		<i>-</i>	<i>0</i>	<i>-</i>
<i>Caex</i>		<i>-</i>	<i>R</i>	<i>R</i>
<i>Loqa</i>		<i>-</i>	<i>0</i>	<i>-</i>
<i>Mica</i>		<i>C</i>	<i>-</i>	<i>-</i>
<i>Tory</i>		<i>-</i>	<i>0</i>	<i>-</i>
<i>Case</i>		<i>-</i>	<i>0</i>	<i>-</i>
<i>Rhan</i>		<i>-</i>	<i>R</i>	<i>0</i>
<i>Juen</i>		<i>-</i>	<i>0</i>	<i>0</i>
<i>Apca</i>		<i>-</i>	<i>R</i>	<i>R</i>
<i>Rowo</i>		<i>-</i>	<i>R</i>	<i>-</i>
<i>Juba</i>		<i>-</i>	<i>R</i>	<i>0</i>
<i>Parvit</i>		<i>-</i>	<i>0</i>	<i>-</i>

*pp/wetls*

Species	General	BW	DS	PP
Egln			O	U
Typha dom (intl. spikes)			-	C
Vine			R	
Cili			R	
Elro			-	C
Euoc			-	C
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat				
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
<p>Comments</p> <p>Sptb Lego Rapipieru } all present</p> <p>Quaga Cere present</p>				

BW=backwall, DS=detritus slope, PP=plunge pool  
 COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
 U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

PP (cont)

Pot nutans U

Sepu O

Pomo O

Potr R

Brte O

Uel O

Aene O

Erat O

Lacser R

Elca R



**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site		6LCA06-97 - Browns C		Date	7/16/97	Workers	JS/KB
Site	Temperature	DO	Conductivity	pH			
pool				8.48			
slickrock	23.9°C			<del>8.48</del> 9.13			
Corning F.	23.9°C	6.6mg/l	117.2µS/cm	9.07			

1  
2  
reading

Water Flow Data (place unit of measurement below Volume)								Solar Pathfinder Data	
--	--	--	--	--	--	--	--	-----------------------	--

Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
$\text{D}_{me}$	secs								
a	4.67							Jan	35
b	4.66							Feb	53
								Mar	54
								Apr	49
								May	40
								June	40
								Ju1	40
								Aug	41
								Sep	54
								Oct	58
								Nov	42
								Dec	27

year  $\bar{x}$  =  $44.4 \pm 9.2$   
 Mar-Aug =  $44.0 \pm 6.0$

① site downcanyon - where 420 flows down into overhang  
 over overhang

①a  $237 + 244 + 246 + 246$   
 $244 + 241 + 212 = 357.6/\text{sec}$

①b  $242 + 245 + 246 + 244$   
 $244 + 241 + 88 + 154$   
 $= 365.6$

$\bar{x} = 361.6 \text{ ml/sec discharge}$

Sept → Feb =  $44.8 \pm 1$

### HANGING GARDEN DATA SHEET

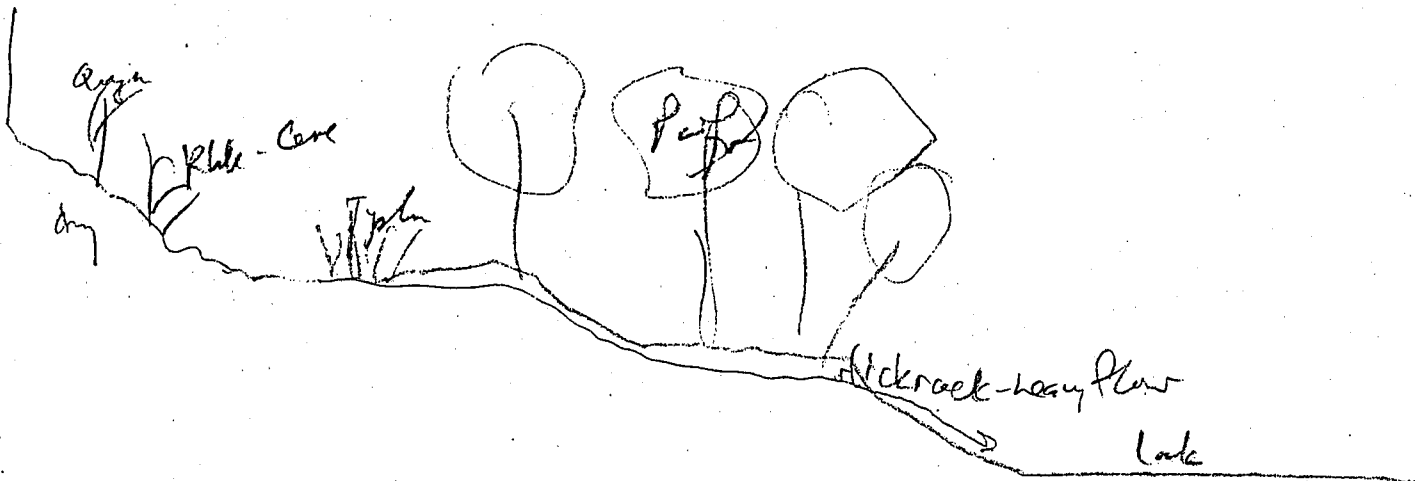
Investigator <span style="font-size: 1.5em;">JS</span>	Date <span style="font-size: 1.5em;">7/16/97</span>	Releve <span style="font-size: 1.5em;">GLA07-97</span>	Record	
Garden location <span style="font-size: 1.2em;">U. Escalante - heavy flow on right side</span>	Aspect <span style="font-size: 1.5em;">90° mag</span>	Geology <span style="font-size: 1.2em;">Nav-Kay inter</span>	Size <span style="font-size: 1.2em;">~0.1 hect</span>	
UTM <span style="font-size: 1.2em;">12-502740E 4139260N</span>				
Distance from drainage	Structure	Elevation	Water flow <span style="font-size: 1.2em;">4.5-5</span>	
			Exposure <span style="font-size: 1.2em;">3.5</span>	
Disturbance <span style="font-size: 1.2em;">Red-spotted Toad</span> <span style="font-size: 1.2em;">rootfall, people (trampling)</span> <span style="font-size: 1.2em;">"spring-like" but really</span>				
Species	General	BW	US	PP
Poff	<span style="font-size: 1.2em;">8m</span>		C-	
Rhize			C-	
Baem			O+	
Adca			O along stream	
Tory			O	
Soca			R	
Loca			⊙	
Asqf			R	
Caem			R	
Epyi			O	
GLst	<span style="font-size: 1.2em;">(?) already coll. at GLA05</span>		⊙	
<del>Saga</del> Sago			O	
Smst			R	
Nuar			U	
Typha			O	
Tuto			R	
Juba			U	
Phan			O	
Puac			O	
Cere			U	
Parvit			U	
Ch near unreg.	<span style="font-size: 1.2em;">c50%</span>		O	

~~Hand~~ consistency of top infl. Wasser

Species	General	BW	DS	PP
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat				
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
<b>Comments</b>				

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

CCSA 07-97



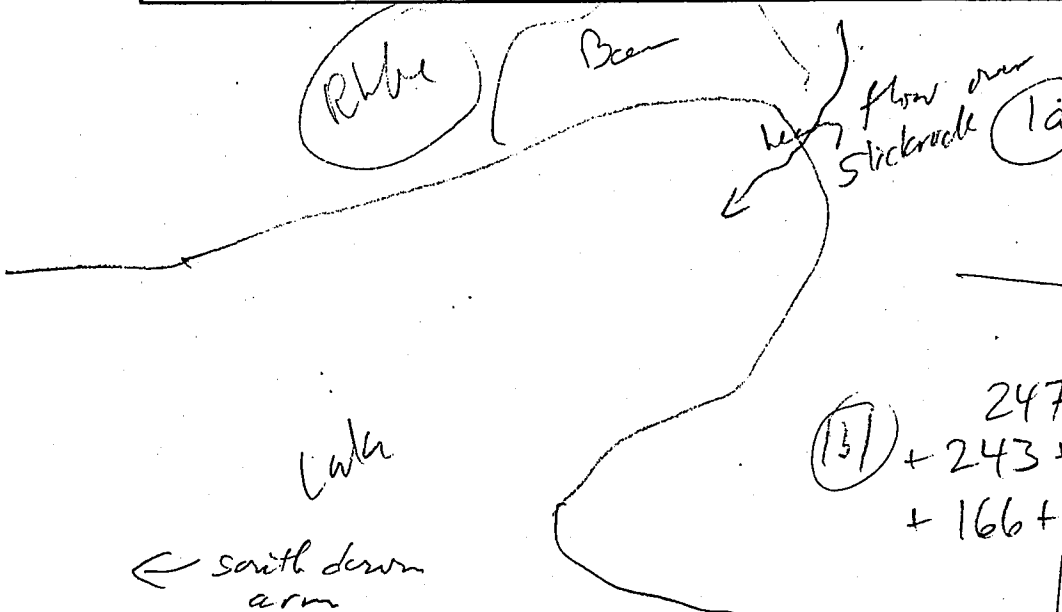
**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <u>6LQA07-97</u>		Date <u>7/16/97</u>	Workers <u>SS/KWB</u>	
Site	Temperature	DO	Conductivity	pH
<u>Corning Int</u>	<u>18.9°C</u>	<u>7.7 mg/l</u>	<u>155.9 μs/cm</u>	<u>7.76</u>

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
--	--	--	--	--	--	-----------------------	--	--	--

Volume ml's	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
<u>1a</u>	<u>2:32</u>							Jan	0
<u>1b</u>	<u>2:00</u>							Feb	0
								Mar	3
								Apr	31
								May	44
								June	50
								Jul	50
								Aug	38
								Sep	18
								Oct	0
								Nov	0
								Dec	0

*(X) side pitfall at site of water source ca 100' from lake*



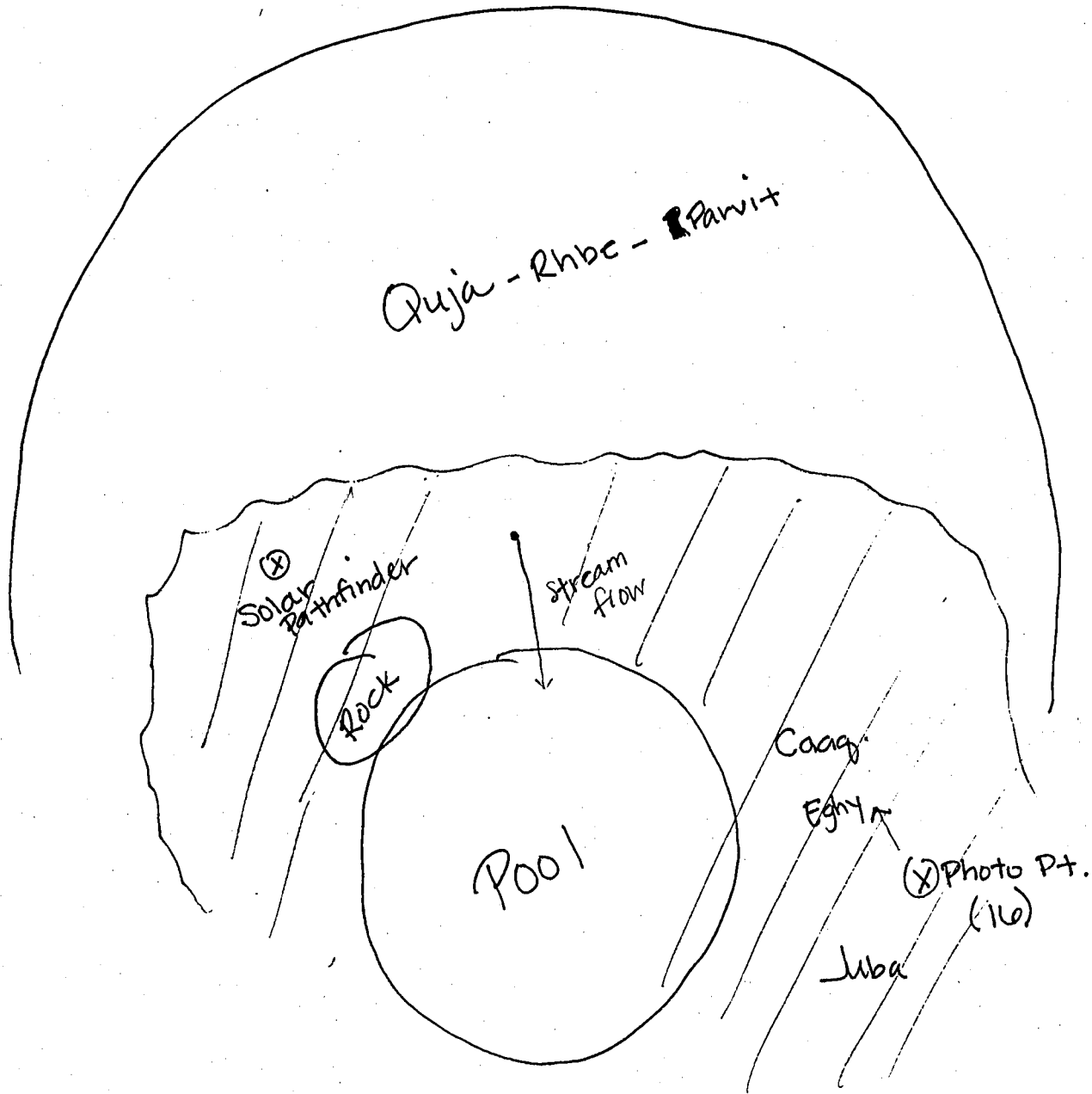
$$\begin{aligned}
 & 245 + 236 + 239 + 245 + \\
 & 241 + 246 + 239 + 205 \\
 & 175 + 85 = 929.3 \text{ ml/sec}
 \end{aligned}$$

$$\begin{aligned}
 & 247 + 238 + 232 \\
 & + 243 + 249 + 249 \\
 & + 166 + 168 = 896.0 \text{ ml/sec}
 \end{aligned}$$

$$\bar{x} = 913 \text{ ml/sec discharge}$$

GLCA 08-97

Cow Canyon



### HANGING GARDEN DATA SHEET

Investigator <i>JS</i>	Date <i>7/17/97</i>	Releve <i>GLCA08-97</i>	Record	
Garden location <i>Just up N. Fork Cow Canyon</i>	Aspect <i>130° mag</i>	Geology <i>Upper Kazanka</i>	Size	
UTM 12 - 506 910E 4141700 <del>RE</del>				
Distance from drainage	Structure	Elevation	Water flow <i>3.0</i>	
			Exposure <i>3</i>	
Disturbance				
Species	General	BW	DS	PP
<i>— Duca</i>			<i>— U</i>	<i>—</i>
<i>— RhBe</i>			<i>— C</i>	<i>—</i>
<i>— Polr</i>			<i>— O</i>	<i>—</i>
<i>— Cete</i>			<i>— O</i>	<i>—</i>
<i>— Parvit</i>			<i>— C</i>	<i>— U</i>
<i>— Barm</i>			<i>— O</i>	<i>— U</i>
<i>— Eahn</i>			<i>— O</i>	<i>— C</i>
<i>— Subd</i>			<i>— O</i>	<i>— A</i>
<i>— Tupha spp.</i>			<i>—</i>	<i>— U</i>
<i>— Toru</i>			<i>— O</i>	<i>— R</i>
<i>— Casc</i>			<i>— O</i>	<i>—</i>
<i>— Phan</i>			<i>— R</i>	<i>— O</i>
<i>— Euc</i>			<i>—</i>	<i>— O</i>
<i>— Elca</i>			<i>— R</i>	<i>— U</i>
<i>— Adca</i>			<i>— O</i>	<i>—</i>
<i>— Tadu</i>			<i>—</i>	<i>— R</i>
<i>— Soas</i>			<i>—</i>	<i>— R</i>
<i>— Caag</i>			<i>—</i>	<i>— C</i>
<i>— Salu</i>			<i>—</i>	<i>— R</i>
<i>— Yuen</i>			<i>—</i>	<i>— O</i>
<i>— Gusp</i>			<i>—</i>	<i>— O</i>
<i>— Tach</i>			<i>—</i>	<i>— R</i>

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <u>62CA08-97</u>		Date <u>7/17/97</u>	Workers <u>05</u>	
Site	Temperature	DO	Conductivity	pH
<u>Comingicut</u>	<u>20.3°C</u>	<u>7.1mg/l</u>	<u>156.7µS/cm</u>	<u>7.01</u>

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data	
--	--	--	--	--	--	-----------------------	--

Volume (ml)	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
<u>186</u>	<u>3.41</u>							<u>Jan</u>	<u>42</u>
<u>90</u>	<u>1.91</u>							<u>Feb</u>	<u>61</u>
<u>134</u>	<u>2.48</u>							<u>Mar</u>	<u>59</u>
<u>104</u>	<u>2.41</u>							<u>Apr</u>	<u>59</u>
<u>202</u>	<u>3.92</u>							<u>May</u>	<u>56</u>
								<u>June</u>	<u>56</u>
<u>54.5µc</u>								<u>Jul</u>	<u>56</u>
<u>47.1</u>								<u>Aug</u>	<u>57</u>
<u>54.0</u>								<u>Sep</u>	<u>59</u>
<u>43.1</u>								<u>Oct</u>	<u>62</u>
<u>51.5</u>								<u>Nov</u>	<u>49</u>
								<u>Dec</u>	<u>27</u>

①

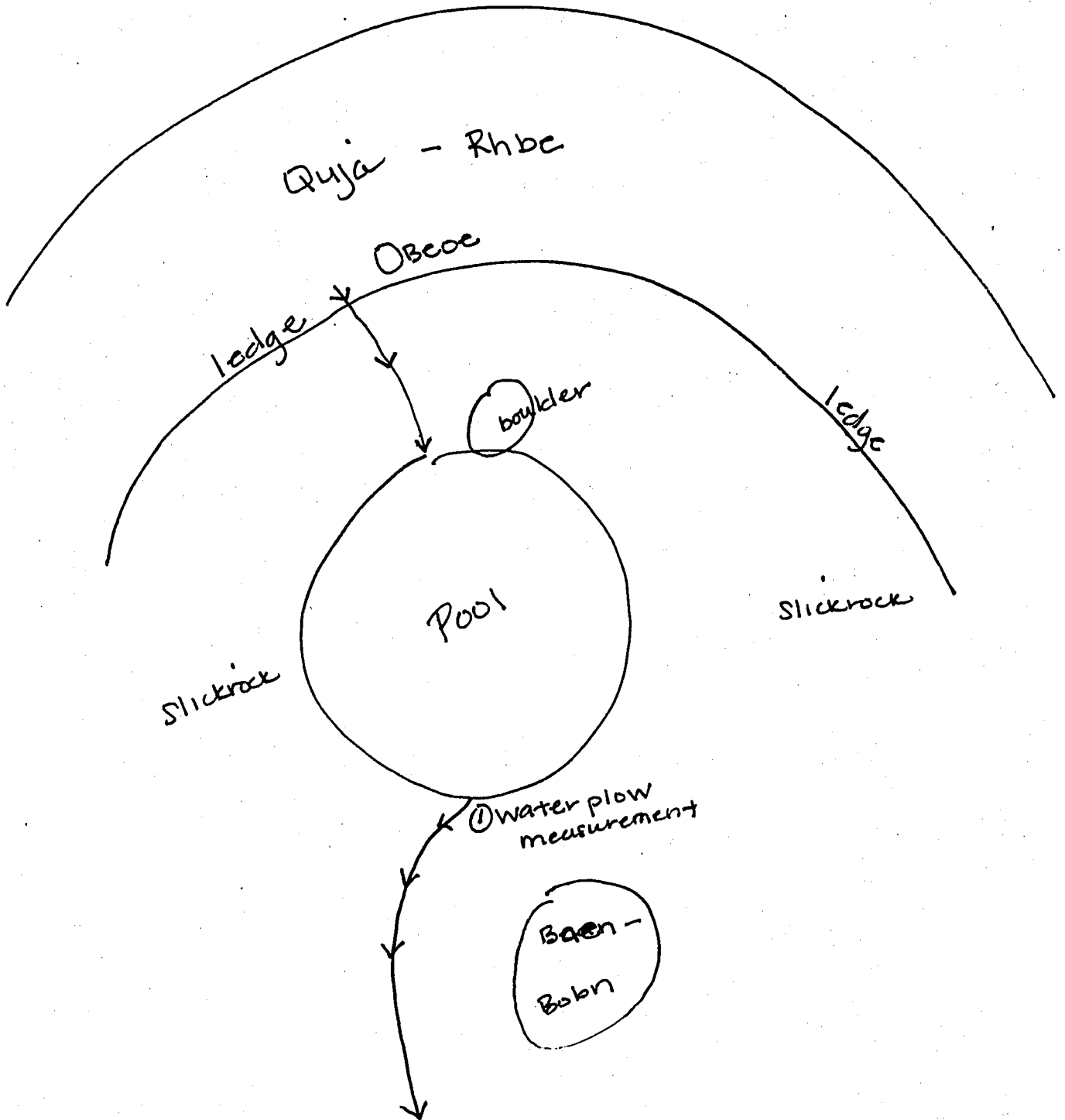
$\bar{X}_{(1)} = 50.0 \text{ ml/sec discharge}$

$\bar{X}_{(\text{year})} = 53.6 \pm 10.0$

$\bar{X}_{(\text{Mar} \rightarrow \text{Aug})} = 57.2 \pm 1.5$

$\bar{X}_{(\text{Sep} \rightarrow \text{Feb})} = 50.0 \pm 13.7$

GCCA 09-97  
Low Canyon





### HANGING GARDEN DATA SHEET

Investigator <b>JS</b>	Date <b>7/17/97</b>	Releve <b>6LCA09-97</b>	Record	
Garden location <b>Corr L. - below fork on R</b>	Aspect <b>170° mag</b>	Geology <b>Nav - Key inter</b>	Size <b>(large)</b>	
UTM <b>12-505920E 4141000N</b>				
Distance from drainage <b>no real backwall</b>	Structure <b>classic Alcove</b>	Elevation	Water flow <b>5.0</b>	
			Exposure <b>4.0</b>	
Disturbance <b>very rocky / bouldery under woodlands Bufo wood.</b>				
Species	General	BW	DS	PP
Adca			- 4	
Asca			- 0	
Casc			- 0	
<del>Ca</del> hy			- 0	
Deel			- 0	
Elca			- 0	
Coca			R	
Paac			- 0	
Ewcl			- R	
*Soas			R	
Pemit			- <del>0</del> C	
Tary			- 0	
Asal			- R	
B-Po			- R	
Arhu			0	
Sosp			- 0	
Cali			- 0	
Beoc			- R - 1 tree	
Rhbe			- 4	
<del>Ca</del> Core			- 0	
Ruch			- C	
Rhar			0	

Species	General	BW	DS	PP
Huta. procumbens			R	
Soca			- O	
Baem			- R	
Pomo			O	
cdli			- O	
Eggy			- O	
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat				
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
<p>Comments</p> <p>Red-spotted Toads Canyon Treefrog</p>				

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

Agot R

Eggy R

Boba ~~B~~C below plunge pool

Typha D " " "

Baem C " "

Mica - R - small spongy rock face below pool

Pt 6.0

Juen - O below pool

Teech - 1 seed. seen

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <u>6LCA09-97</u>		Date <u>7/17/97</u>	Workers <u>TE/KB/TL</u>	
Site	Temperature	DO	Conductivity	pH
<u>Corning Inst</u>	<u>20.9°C</u>	<u>7.3mg/l</u>	<u>162.7µS/cm</u>	<u>7.62</u>

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
Volume ml	Time sec	Volume	Time	Volume	Time	Volume	Time	Month	%
<u>1a</u>	<u>1.94</u>							<u>Jan</u>	<u>59</u>
<u>1b</u>	<u>1.75</u>							<u>Feb</u>	<u>60</u>
								<u>Mar</u>	<u>48</u>
								<u>Apr</u>	<u>50</u>
								<u>May</u>	<u>46</u>
								<u>June</u>	<u>46</u>
								<u>Jul</u>	<u>46</u>
								<u>Aug</u>	<u>48</u>
								<u>Sep</u>	<u>54</u>
								<u>Oct</u>	<u>53</u>
								<u>Nov</u>	<u>64</u>
								<u>Dec</u>	<u>59</u>

(-15% of flow)

Solar P.

$$\bar{X}(\text{year}) = 52.8 \pm 6.4$$

$$\bar{X}(\text{Mar} \rightarrow \text{Aug}) = 47.3 \pm 1.6$$

$$\bar{X}(\text{Sep} \rightarrow \text{Feb}) = 58.2 \pm 4.1$$

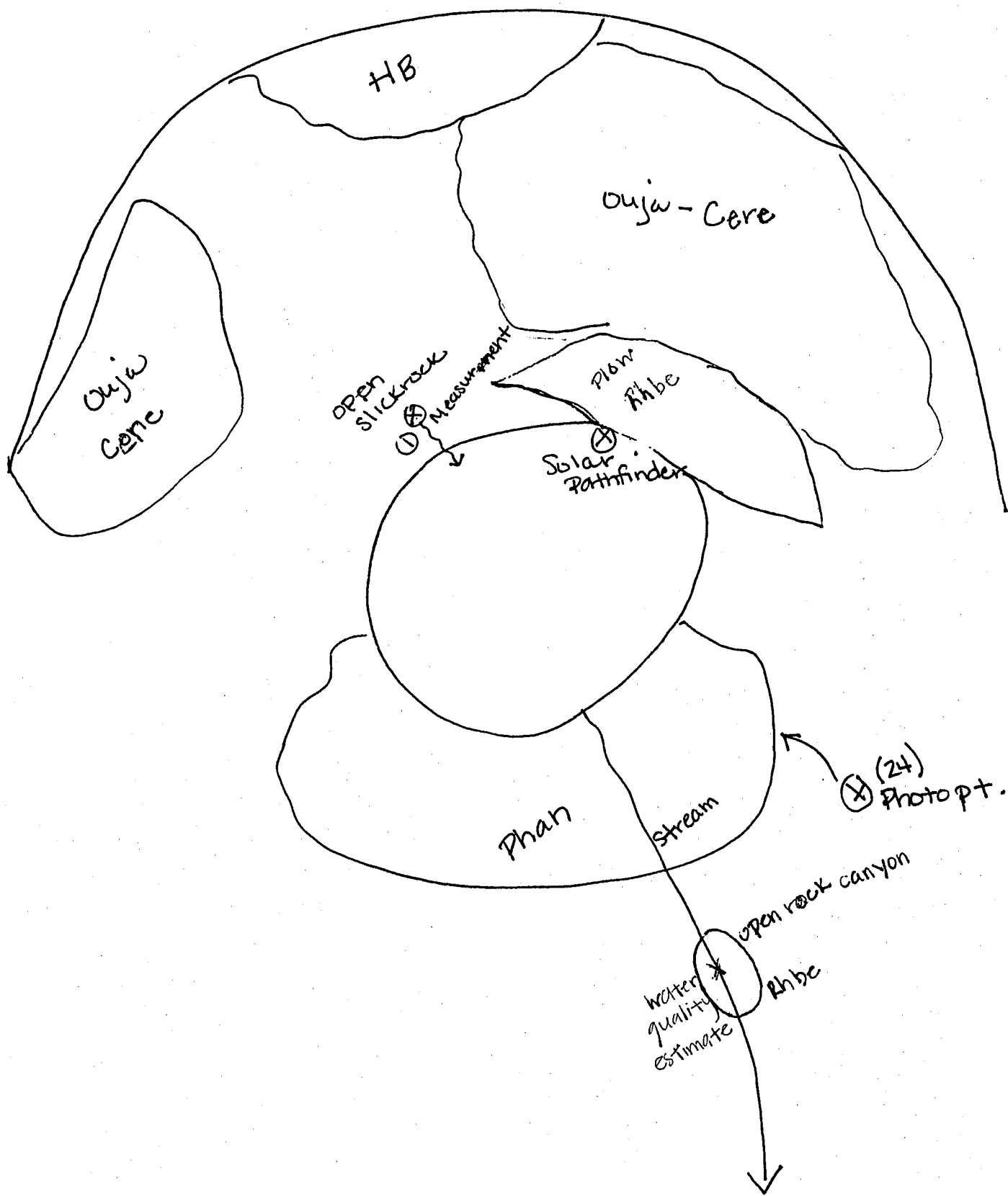
$$\begin{aligned} \underline{1a} \quad & 245 + 242 + 244 + 244 \\ & + 222 + 240 + 188 = 837.6 \text{ ml/sec} \end{aligned}$$

$$\begin{aligned} \underline{1b} \quad & 240 + 247 + 244 + 204 \\ & 246 + 188 = 782.3 \text{ ml/sec} \end{aligned}$$

(810 + 5% =)

= 850 ml/sec  
discharge

GCEA 10-97  
Cov Canyon



### HANGING GARDEN DATA SHEET

Investigator <i>JS</i>	Date <i>7/17/97</i>	Releve	Record	
Garden location <i>GLCA10-97</i> <i>low canyon - <del>east</del> South</i> <i>fork of main N. Fork</i> <i>(already sampled)</i>	Aspect <i>220°</i> <i>Mag</i>	Geology <i>NW -</i> <i>King</i> <i>inter</i>	Size <i>large</i> <i>&gt; 1000 m<sup>2</sup></i>	
UTM <i>2</i>	Distance from drainage <i>12-510 780E 4145-850N</i>	Structure	Elevation	
			Water flow <i>3.0</i>	
Exposure				
Disturbance <i>mostly woodl. or pp - not much HG</i> <i>Loze - Phan</i>				
Species	General	BW	DS	PP
<i>Cere</i>				<i>U</i>
<i>Ayca</i>				<i>C</i>
<i>Rubel</i>	<i>woodl.</i>			<i>A</i>
<i>Parvit</i>				<i>C</i>
<i>Arne</i>				<i>O</i>
<i>Ciry</i>				<i>O</i>
<i>Tydo</i>				<i>U</i>
<i>Phan</i>				<i>A</i>
<i>Juen</i>				<i>O</i>
<i>Caag</i>				<i>C</i>
* <i>Asst</i>				<i>O</i>
<i>Pol d. fol</i>				<i>A in p. soil</i>
* <i>Sous</i>				<i>O</i>
<i>Mare</i>				<i>O</i>
<i>Tony</i>	<i>woodl.</i>			<i>O</i>
<i>Chl</i>				<i>R</i>
<i>Cast</i>				<i>U</i>
* <i>Tach</i>				<i>O</i>
<i>insect Zira on B. 1/05</i>				
<i>saw Epi on ES</i>				

*Smst, Taof,*  
*Puac, ~~Ag mi~~, Cahy, Egl, ~~Pol/Arse~~, Soet, Sosp, Car, Phan Pri, Mica*



RIPARIAN SURVEY-GLEN CANYON NATIONAL RECREATION AREA

Location Cow Canyon - at upper end of S fork of N fork

Site plots 3, 4 Date 7-30-92 Observers J. Spence

Elevation 1372 Aspect 270 Geology NAV-KAY

Stream Classification \_\_\_\_\_ Water flow FR ~~225~~ 3.0

Disturbance \_\_\_\_\_

Community classification/description large garden

Species	Woody DS	PP		Woody DS	PP
1 <u>Oryza</u>	<u>A</u>	<u>-</u>	16	<u>Poa</u>	<u>0</u>
2 <u>Rhiz</u>	<u>C</u>	<u>-</u>	17	<u>Ely</u>	<u>0</u>
3 <u>Ciry</u>	<u>0</u>	<u>R</u>	18	<u>Sax</u>	<u>0</u>
4 <u>Care</u>	<u>0</u>	<u>-</u>	19		
5 <u>Clly</u>	<u>C</u>	<u>-</u>	20		
6 <u>Mare</u>	<u>U</u>	<u>-</u>	21		
7 <u>Epsi</u>	<u>R</u>	<u>-</u>	22		
8 <u>Agmi</u>	<u>R</u>	<u>-</u>	23		
9 <u>Cere</u>	<u>U</u>	<u>-</u>	24		
10 <u>Tory</u>	<u>R</u>	<u>-</u>	25		
11 <u>Aene</u>	<u>R</u>	<u>-</u>	26		
12 <u>Tydo</u>	<u>-</u>	<u>0</u>	27		
13 <u>Phen</u>	<u>-</u>	<u>D</u>	28		
14 <u>Jhen</u>	<u>-</u>	<u>0</u>	29		
15 <u>Caky Caaby</u>	<u>-</u>	<u>U</u>	30		

Abundance (A=95-100%; D=50-95%; C=10-50%; U=1-10%; 0=<1%; R=<<1%)

Sociability (1=even; 2=random; 3=patchy; 4=very patchy)

s=sexual-flowering; v=vegetative

Notation: Ceoc (3-4)sC-3

Notes:

RIPARIAN SURVEY-GLEN CANYON NATIONAL RECREATION AREA

Location Cow Canyon - at upper end of S fork of N Fork

Site plots 1, 2 Date 7-30-92 Observers J. Spruce

Elevation 4500 Aspect 270 Geology NAU-KAY

Stream Classification 1372 Water flow FR ~~5-20~~ 3.0

Disturbance rockfall, trampling

Community classification/description very large HG - extensive woody veg on DS - 4 plots

Species	herbaceous DS	BW	Other sp. in garden	
1 <u>Casc</u>	<u>A</u>	<u>R</u>	16 <u>Ouga</u>	<u>Cere</u> <u>Tydo</u>
2 <u>Ciry</u>	<u>C</u>	<u>O</u>	17 <u>*Ware</u>	<u>Rhbe</u> <u>#Juen</u>
3 <u>Agmi</u>	<u>O</u>	<u>-</u>	18 <u>Paac</u>	<u>Tory</u> <u>Baex</u>
4 <u>Sasp</u>	<u>O</u>	<u>O</u>	19 <u>Adea</u>	<u>Phen</u>
5 <u>Epgi</u>	<u>O</u>	<u>-</u>	20 <u>Juos</u>	<u>*Taaf (unusual)</u>
6 <u>Zova</u>	<u>R</u>	<u>O</u>	21 <u>Parvi</u>	<u>Pose</u>
7 <u>Cacu</u>	<u>U</u>	<u>U</u>	22 <u>Smst</u>	<u>ClLi</u>
8 <u>Caau</u>	<u>R</u>	<u>-</u>	23 <u>Tory</u>	<u>Aere</u>
9 <u>Mica</u>	<u>-</u>	<u>U</u>	24 <u>[note that Welsh called this Mica! (in flower at time = mica)]</u>	
10 <u>Prsp</u>	<u>-</u>	<u>O</u>	25	
11 <u><del>Pa</del></u>			26	
12			27	
13			28	
14			29	
15			30	

Abundance (A=95-100%; D=50-95%; C=10-50%; U=1-10%; O=<1%; R=<<1%)

Sociability (1=even; 2=random; 3=patchy; 4=very patchy)

s=sexual-flowering; v=vegetative

Notation: Ceoc (3-4)sC-3

Notes:



**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <u>62CA10-97 Cow C.</u>		Date <u>7/17/97</u>	Workers <u>JS/VA/TW</u>	
Site	Temperature	DO	Conductivity	pH
<u>Corning Ind.</u>	<u>26.3°C</u>	<u>7.6 mg/l</u>	<u>207 us/cm</u>	<u>8.70</u>

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
--	--	--	--	--	--	-----------------------	--	--	--

Volume ml	Time Sec	Volume	Time	Volume	Time	Volume	Time	Month	%
<u>238</u>	<u>2.50</u>	<u>→</u>	<u>95.2</u>					<u>Jan</u>	<u>43</u>
<u>228</u>	<u>2.91</u>		<u>78.4</u>	<u>discard</u>	<u>&gt;10% of X</u>			<u>Feb</u>	<u>48</u>
<u>250</u>	<u>2.81</u>		<u>89.0</u>					<u>Mar</u>	<u>52</u>
<u>247</u>	<u>2.44</u>		<u>101.2</u>					<u>Apr</u>	<u>50</u>
<u>258</u>	<u>2.69</u>		<u>95.9</u>					<u>May</u>	<u>37</u>
<u>243</u>	<u>2.65</u>		<u>91.7</u>					<u>June</u>	<u>37</u>
<u>248</u>	<u>2.44</u>		<u>101.6</u>					<u>Jul</u>	<u>37</u>
<u>253</u>	<u><del>2.53</del></u>	<u>2.53</u>	<u>100.0</u>					<u>Aug</u>	<u>48</u>
<u>246</u>	<u>2.82</u>		<u>87.2</u>					<u>Sep</u>	<u>52</u>
<u>242</u>	<u>2.72</u>		<u>89.0</u>					<u>Oct</u>	<u>47</u>
								<u>Nov</u>	<u>40</u>
								<u>Dec</u>	<u>41</u>

①

+ 25% of ①  
other seepage sites

(year)  $\bar{x} = 44.3$

$$\bar{x}_D = 94.5 \pm 5.6 \text{ ml/sec}$$

$$\bar{x}_{tot} = 94.5 + (25\%) = 118.1 \text{ ml/sec discharge}$$

HANGING GARDEN DATA SHEET

GLCA11

Investigator JS		Date 3/13/95	Releve RAN01	Record
Garden location Un-named canyon N of Low Canyon on Esc. Arm - "Rana" C. UTM 12-504170E 4141240N		Aspect 205° MN	Geology Koyukto & Navajo	Size ca 3000 m <sup>2</sup> of vegetation
Distance from drainage at Loc 8	Structure clastic alcove III + PP	Elevation 3800'	Water flow 4.0 (heavy)	Exposure 4.0
Disturbance deer, rockfall, sheeping,				
Species	General	BW difficult % reach or size	DS 100 m <sup>2</sup>	PP present &
Paoc			C	large
CASC			U	
Adca			U	
Phan			D	
Elro			A	
Cacu			C	
Clli			D	
Vine <i>Viola v. phrophylla</i>			D	
Asca			D	
Sosp grazed!			D	
Cim			U	
Jaca			R	
Loca			U	
Agmi			R	
Parvit			R	
<p>Acne, Cere, Rhbe, Quia, Tury, Smst, Ziva Peca, Mira, Prsp, Adca, Clli 5</p> <p>PP = Saer, Baem, Juba, Vine, Tydo, Phan, Esffely</p>				

also *Sanilacina stellata*

Species	General	BW	DS	PP
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat				
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				

Comments

multiple bands (3+) of recitation - in Navaja + waja karl  
at Nav-kay interface -

Probably the largest alve garden I have ever seen

Ziva present - A or ledges in upper part of garden

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <i>GLCA 11-97 (RANNA CANYON)</i>		Date <i>7/17/97</i>		Workers <i>KB/JS/JM/J</i>
Site	Temperature	DO	Conductivity	pH
<i>Corning Inst.</i>	<i>23.5 °C</i>	<i>7.2 mg/L</i>	<i>203 μS/cm</i>	<i>8.21</i>

Water Flow Data (place unit of measurement below Volume)	Solar Pathfinder Data
--	-----------------------

Volume (ml)	Time (sec)	Volume	Time	Volume	Time	Volume	Time	Month	%
<i>240</i>	<i>2.25</i>	<i>106.7 ml</i>	<i>SEC*</i>					Jan	18
<i>240</i>	<i>1.75</i>	<i>137.1 ml</i>	<i>SEC</i>					Feb	31
<i>228</i>	<i>1.69</i>	<i>134.9 ml</i>	<i>SEC</i>					Mar	34
<i>226</i>	<i>1.56</i>	<i>144.9 ml</i>	<i>SEC</i>					Apr	38
<i>228</i>	<i>1.60</i>	<i>142.5 ml</i>	<i>SEC</i>					May	35
								June	41
								Jul	41
								Aug	36
								Sep	41
								Oct	30
								Nov	17
								Dec	18

\* DISCARDED VALUES THAT DEVIATED > 10% FROM  $\bar{X}$

$\bar{X} = 140 \text{ ml/SEC}$   
 $= \text{TOTAL } Q_{11-97}$

$\bar{X}(yr) = 31.7 \pm 9.2$

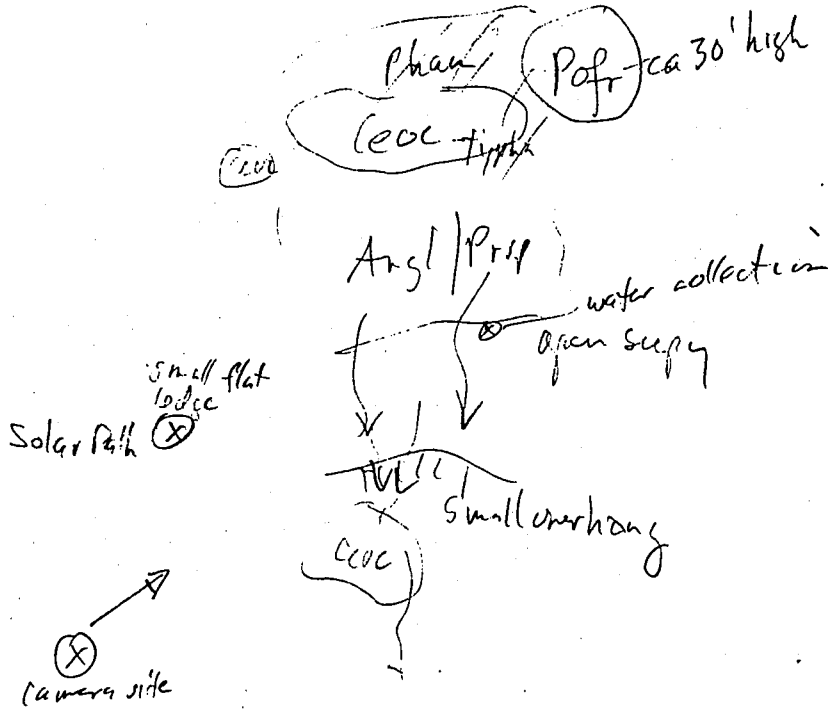
$\bar{X}(\text{Mar} \rightarrow \text{Aug}) = 37.5 \pm 3.0$

$\bar{X}(\text{Sep} \rightarrow \text{Feb}) = 25.8 \pm 9.7$

**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

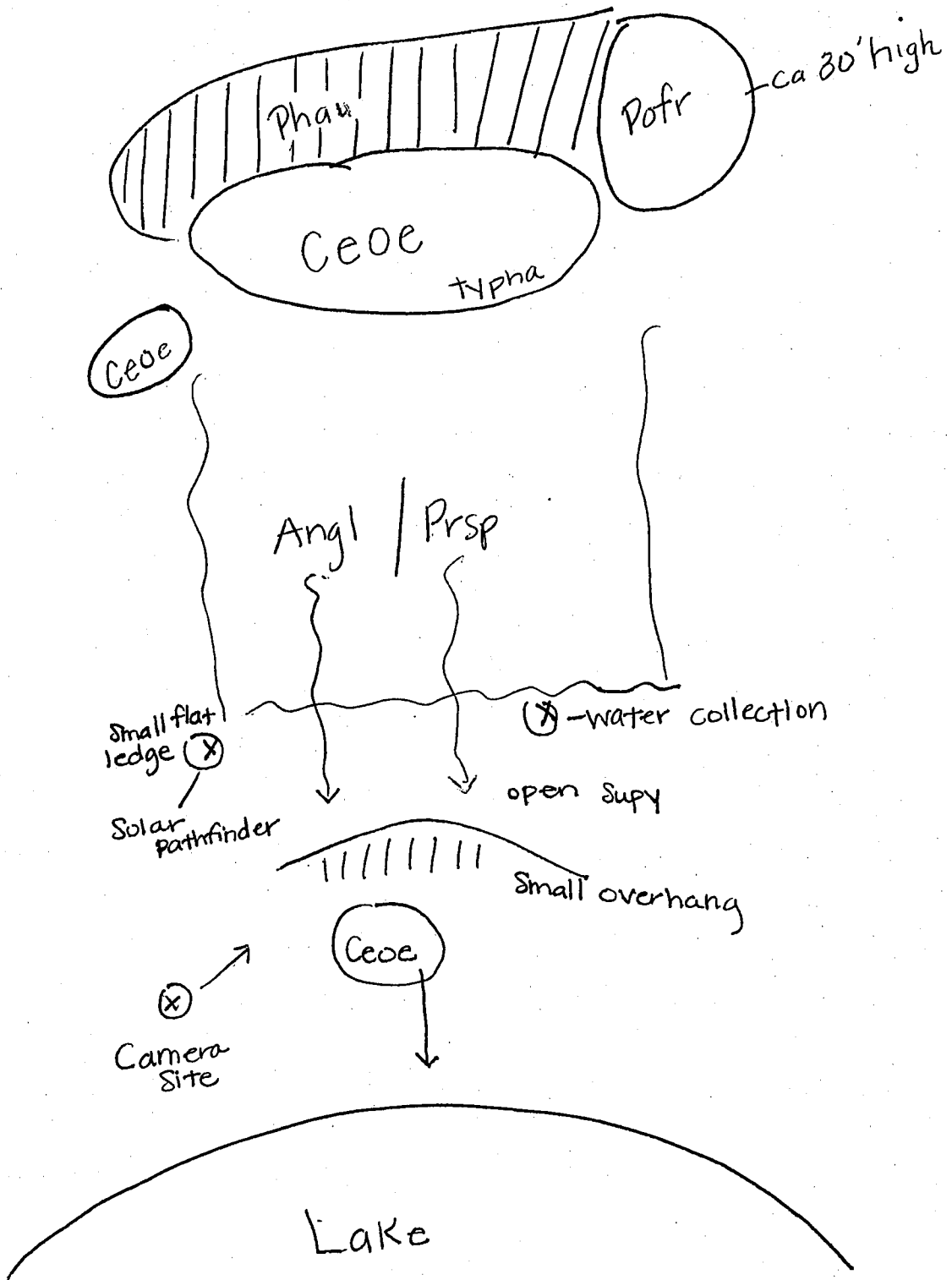
Project	Spring	Worker
Location	near Buoy 14a - little canyon on FD	
Topo Map	UTM 539380E 4166470N	
Transect/Releve No.	GLCA 12-97	Date 8/13/97

Sketches below and on back



GCCA 12-97

Lake Buoy 114a



### HANGING GARDEN DATA SHEET

Investigator <i>JS</i>	Date 8/13/97	Releve GLSA-12-94	Record	
Garden location Small sidecanyon Near Bury 117 - up from <u>Clardin</u> Path	Aspect 250°	Geology N/K	Size	
UTM				
Distance from drainage	Structure	Elevation	Water flow	
			Exposure	
Disturbance Some damage done by us - trampling in the H <sub>2</sub> O/algal mat <span style="float: right;">some slickrock open rocky slope - sunny</span>				
Species	General	BW	JS	PP
<i>P. br</i> 1 tree			U	
<i>Cooc</i>			U	
<i>Angl</i>			<del>C</del>	
<i>P. SD</i>			C	
<i>S. S. p</i>			U	
<i>Caau</i>			O	
<i>Juba</i>			O	
<i>P. ac</i>			U	
<i>Phan</i>			C	
<i>Cali</i>			O	
<i>Egqi</i>			R	
<i>Rhar</i>			O	
<i>Brva</i>			O	
<i>Tudo</i>			O	
<i>Muth</i>			O	
* <i>Tach</i> 1 seedling			R	
<i>Peca</i> (common below, above)			O	
<i>Funaria hygrometrica</i> (Common around edge - open mats)				

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <u>GCQA-12-97</u>				Date <u>8/13/97</u>		Workers <u>JS</u>				
Site	Temperature	DO	Conductivity	pH						
	<u>27.9</u>	<u>2.1</u>	<u>357</u>	<u>7.83</u>						
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data			
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%	
								Jan	<u>83</u>	
								Feb	<u>86</u>	
								Mar	<u>84</u>	
								Apr	<del>78</del> <u>81</u>	
								May	<u>83</u>	
								June	<u>79</u>	
								Jul	<u>83</u>	
								Aug	<u>79</u>	
								Sep	<u>84</u>	
								Oct	<u>84</u>	
								Nov	<u>81</u>	
								Dec	<u>83</u>	

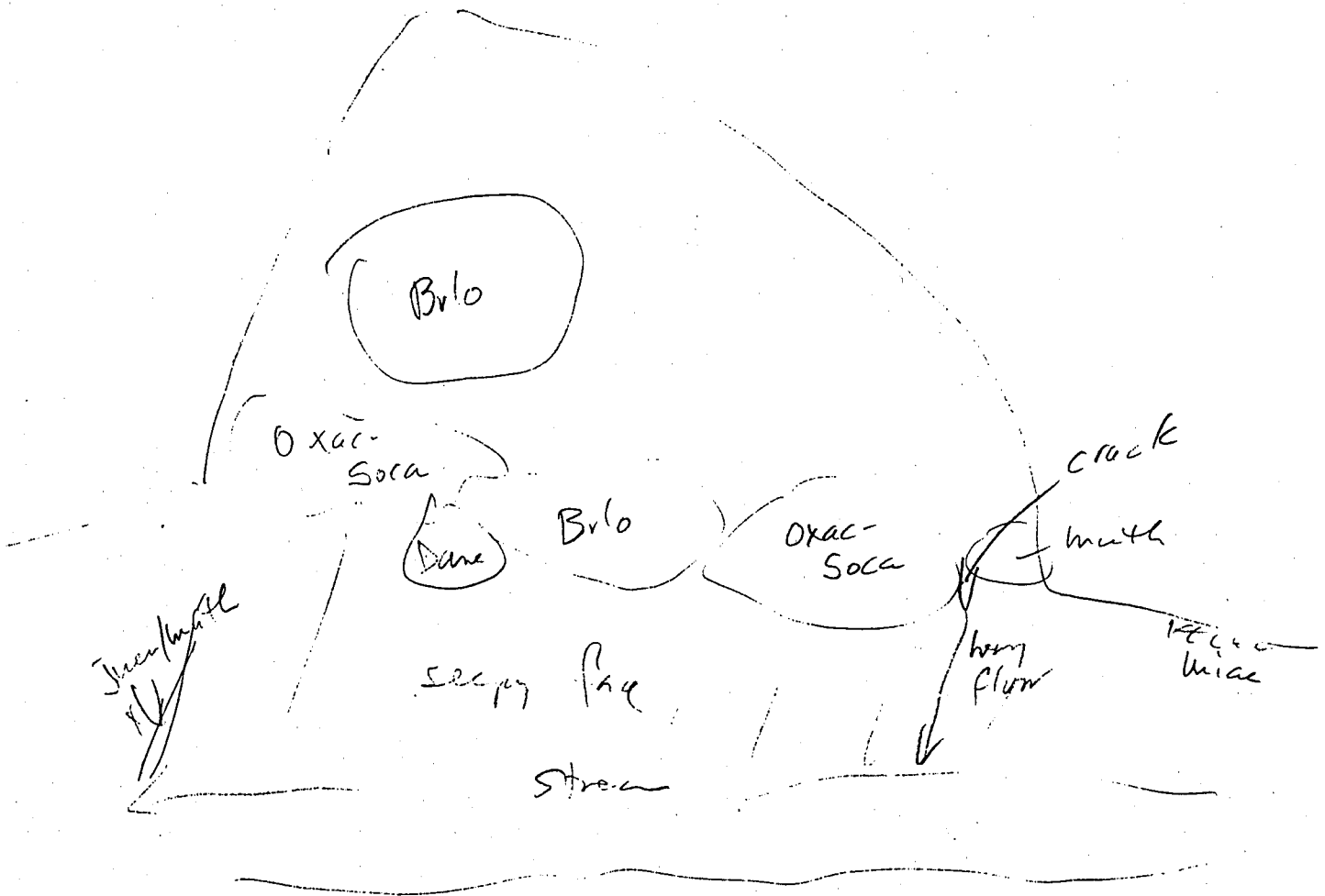
$\bar{x} = 82.5$ 
 Can't do H<sub>2</sub>O discharge < 10 ml/sec - seepy slope but no obvious flows



**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	Worker
Location <i>Wall Spring - Ticaboo</i>	
Topo Map	UTM <i>541950E 4173310N</i>
Transect/Releve No. <i>GLCA13-97</i>	Date

Sketches below and on back



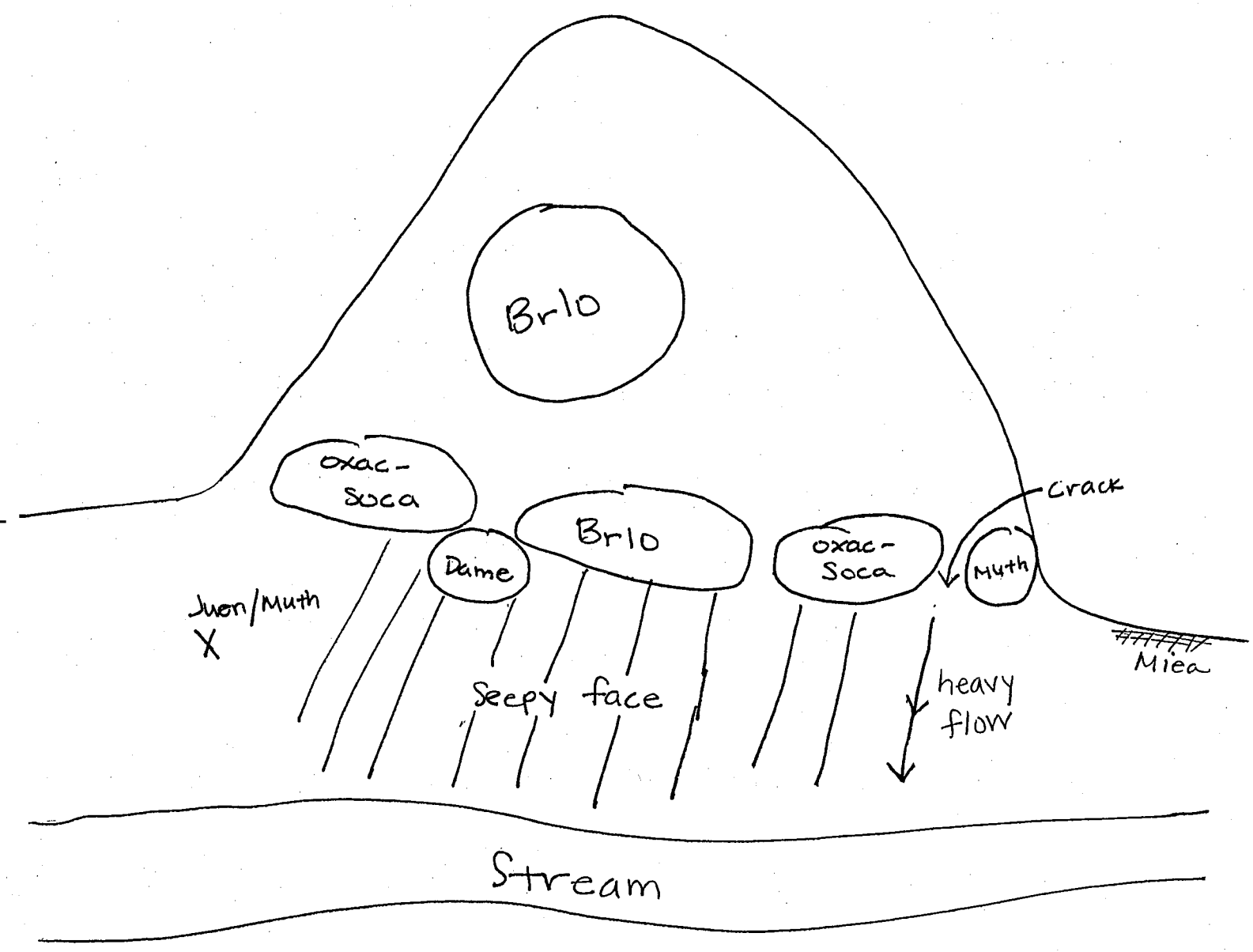
⊗ solar Pathfinder

⊗ photo

GLCA RIPARIAN VEGETATION DATA FORM 1

Map	Location "Wall Spring" Tredgore C.	Date 8/13/97	Observers JS
UTM	GLCA13-97	Relieve	Elevation
Geomorphology H <sub>2</sub> O issuing out of a cliff			
Aspect 130° mag	Substrate <del>Navajo</del>	Terrace	PFI
Exposure 3.0	Water 4.0	Canyon D	Canyon W
Geology Navajo			
Disturbance Woodhouse's Trail Sonoran Whipsnake up by woodshed near			
Code	Species	Prominence	Collection
1	Oxal	C	
2	Dame	U	
3	Brlb	C	
4	Tuohia s.p.	R	
5	Adca	O	
6*	Agse	O	
7*	Turk-	R	
8	Muth (sterile)	O	
9	Miea	O	
10	Loca	R	
11	Epgi	R	
12	Jhen	O	
13	Muth	I	
14	Eghy	R	
15	J		

GLCA 13-97



(X) solar pathfinder

(X) photo

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site GLCA-97-13				Date 8-13-97		Workers Spence				
Site	Temperature	DO	Conductivity	pH						
①	20.6	8.1	408	8.03						
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data			
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%	
490	1.94	<del>252.6</del> ml/sec						Jan	66	
515	2.19	235.2						Feb	68	
455	1.78	255.6						Mar	68	
410	1.9	<del>215.2</del>						Apr	65	
480	1.84	260.9						May	67	
530	1.8	294.4						June	69	
415	1.44	288.2						Jul	69	
445	1.56	285.2						Aug	63	
465	1.65	281.8						Sep	68	
500	1.60	<del>312.5</del>						Oct	66	
								Nov	64	
								Dec	53	
		$\bar{x} = 268.2$								

①

N=7

$\bar{x} = 65.5$

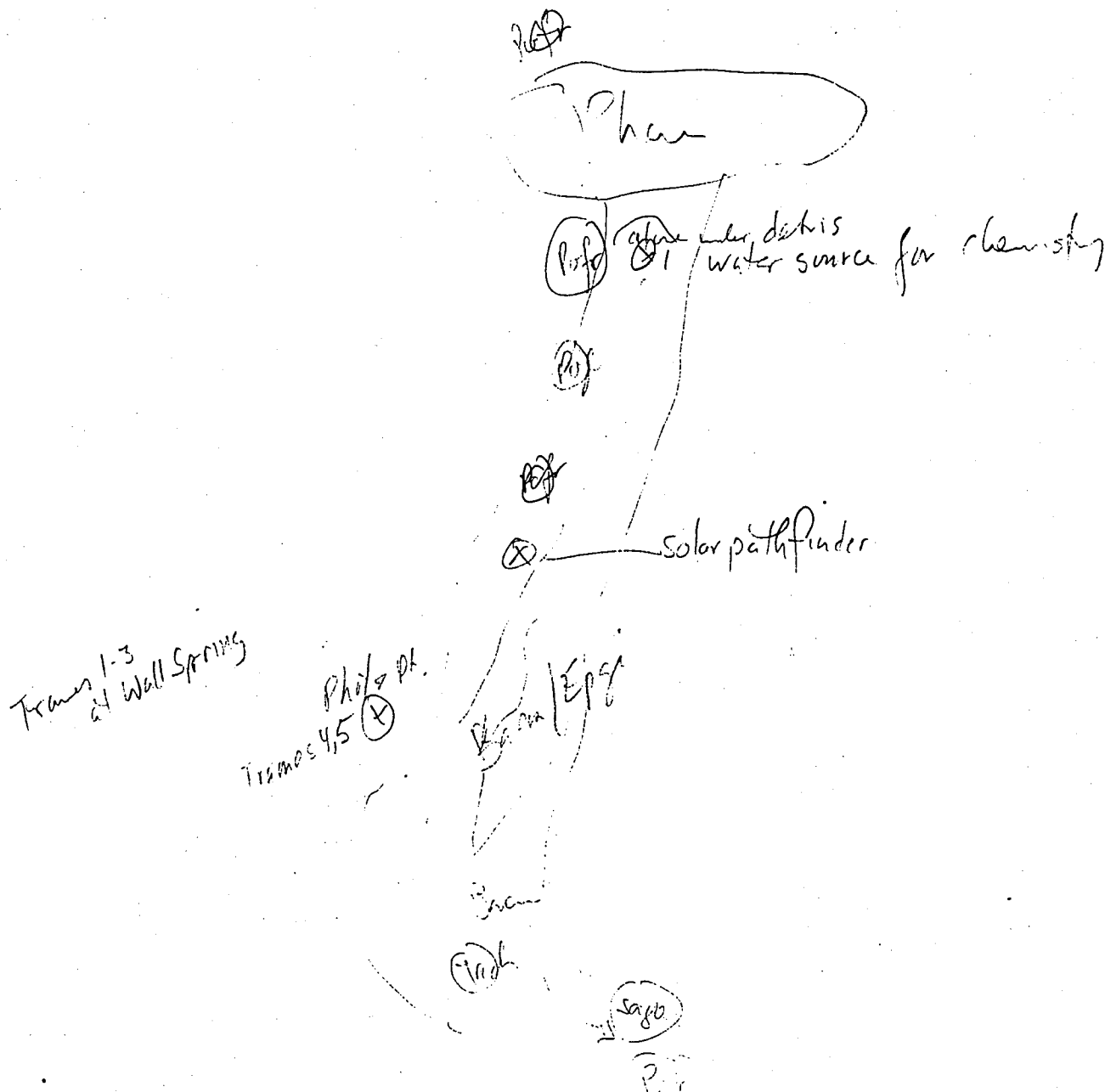
+3% of ①

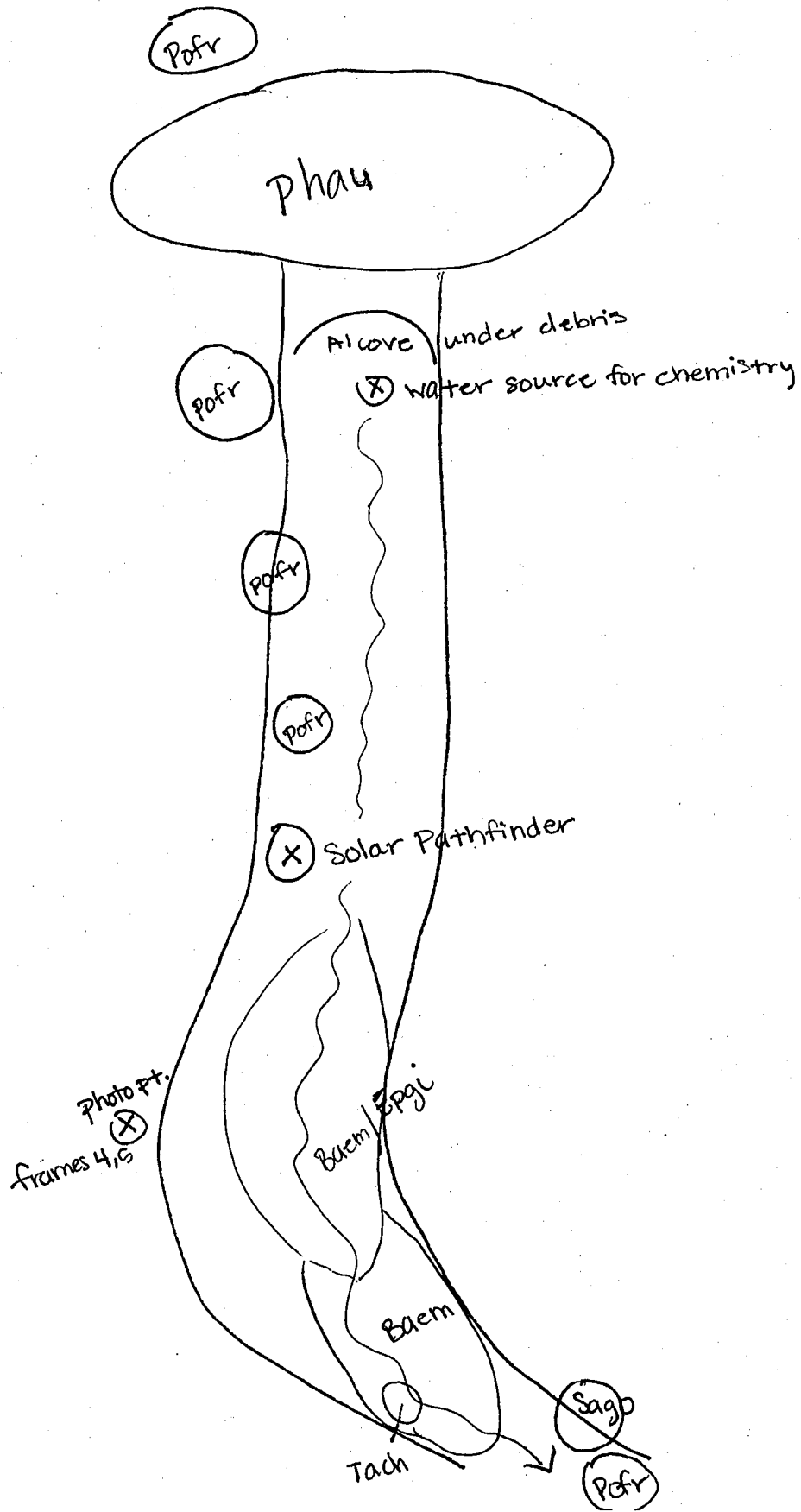
$$\bar{x} = 274.1 + 3\% = 282.3 \text{ ml/sec}$$

**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	Spring	Worker	JS
Location	Good Hope Bay		
Topo Map	GH Bay	UTM	5468100E 4166100N
Transect/Releve No.	6LCA14-97	Date	8/14/97

Sketches below and on back







**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site		6LCA14-97				Date		Workers	
Site	Temperature	DO		Conductivity		pH			
	19.4	7.8		503		7.90			
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	83
								Feb	81
								Mar	81
								Apr	92
								May	91
								June	91
								Jul	91
								Aug	92
								Sep	91
								Oct	84
								Nov	79
								Dec	77

discharge = 57.0 ml/sec

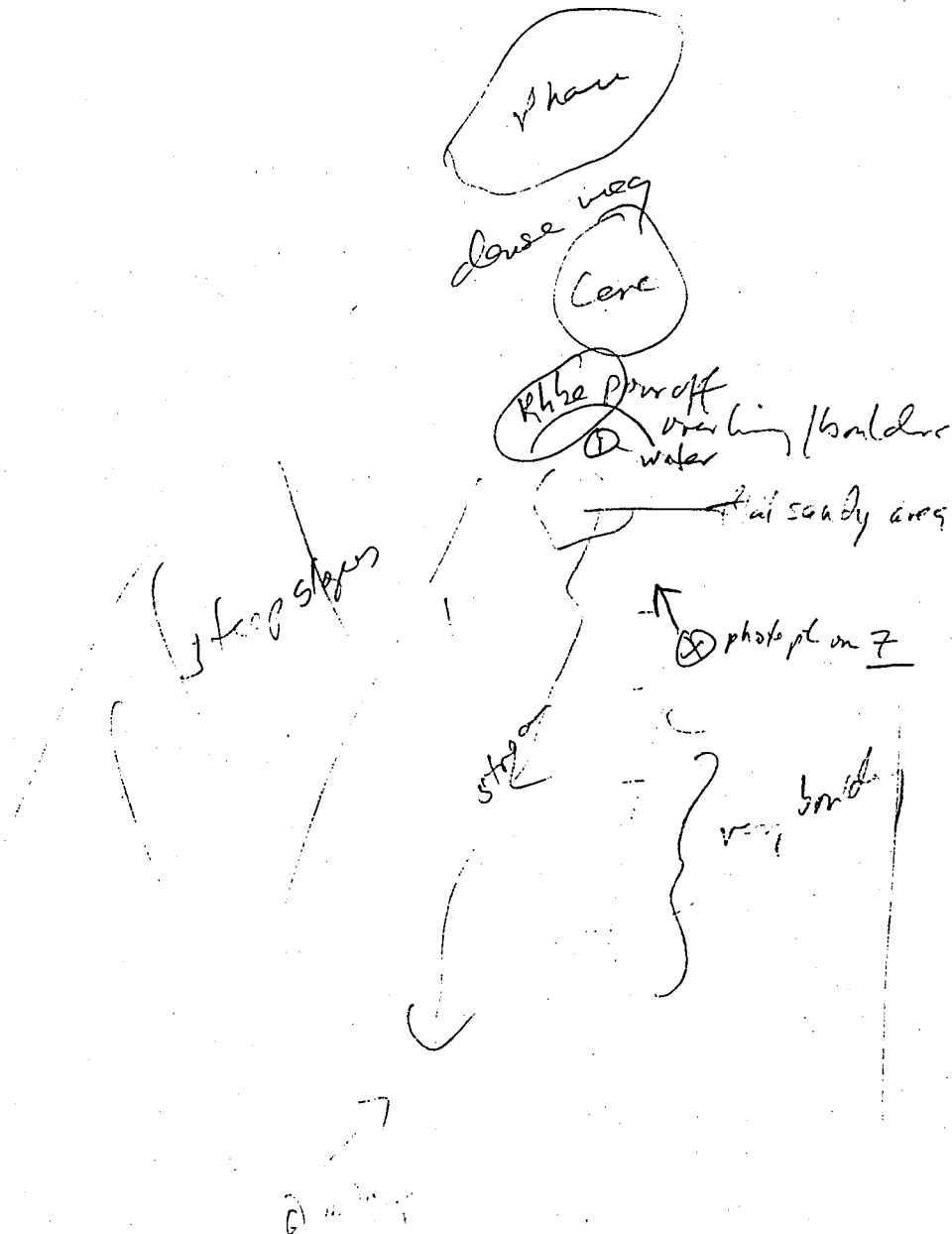
$\bar{X} = 86.9$



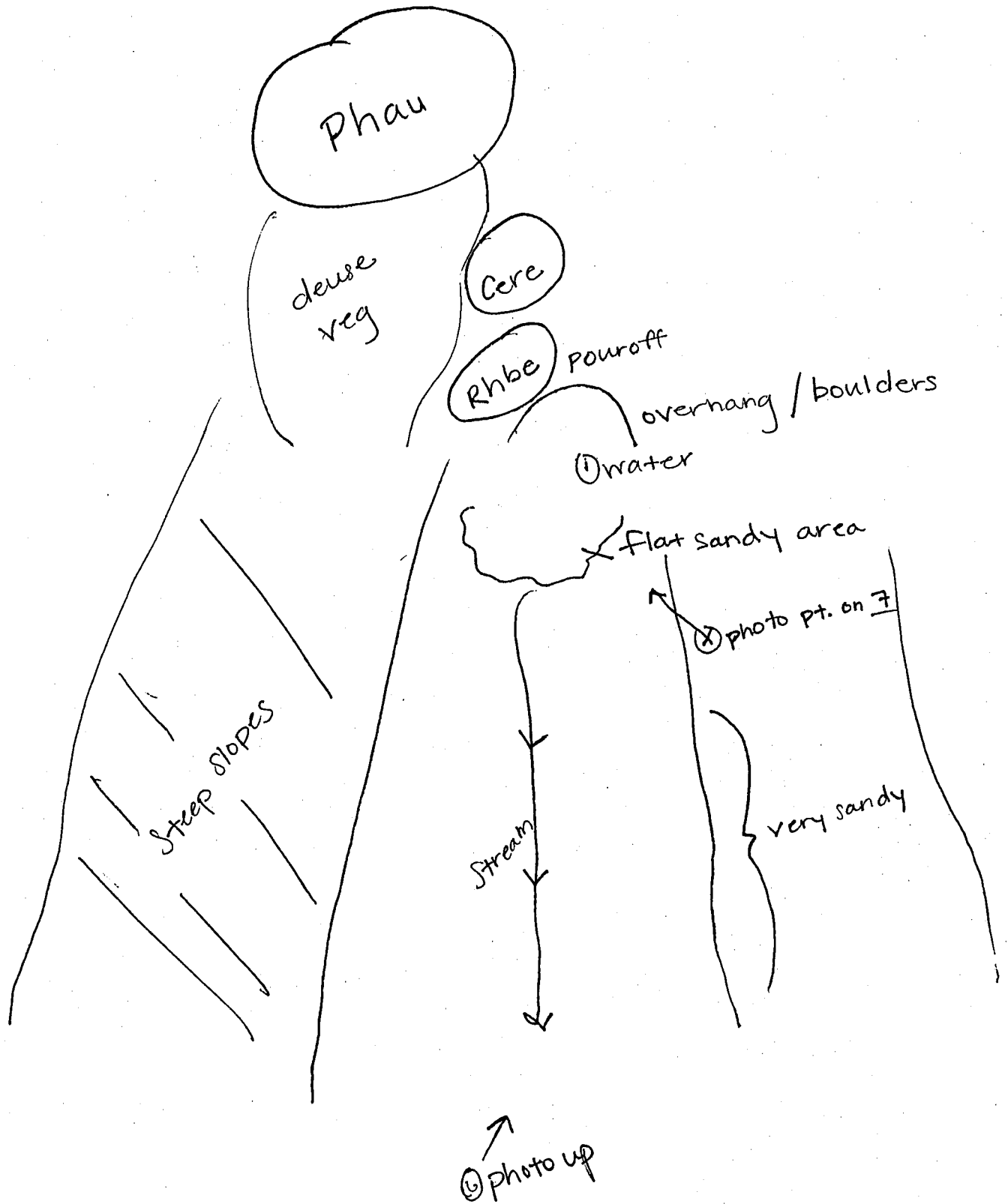
**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	Worker
Location <i>Good Hope Bay</i>	
Topo Map	UTM <i>547800E 4167480N</i>
Transect/Releve No. <i>GLCA 15-97</i>	Date <i>8/14/97</i>

Sketches below and on back



GCCA 15-97  
Good Hope Bay





Species	General	BW	DS	PP
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat				
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
Comments				

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

Small kg size to E in next drainage

Agui O  
Rubi U  
Oxal U  
Adca R  
Phan O  
Wath O

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site	6LCA15-97	Date	8/14/97	Workers	JS/KB
------	-----------	------	---------	---------	-------

JSW

①

Site	Temperature	DO	Conductivity	pH
Corning I.	19.2	7.4	548	7.92

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
--	--	--	--	--	--	-----------------------	--	--	--

①

Volume ml	Time sec	Volume	Time	Volume	Time	Volume	Time	Month	%
<del>285</del>	<del>11.13</del>							Jan	6
255	4.60							Feb	25
230	5.19							Mar	5.9
190	5.25							Apr	67
235	5.60							May	71
210	5.15							June	86
205	4.59							Jul	72
210	5.60							Aug	65
255	7.12							Sep	66
185	5.84							Oct	36
185	6.06							Nov	6
								Dec	0

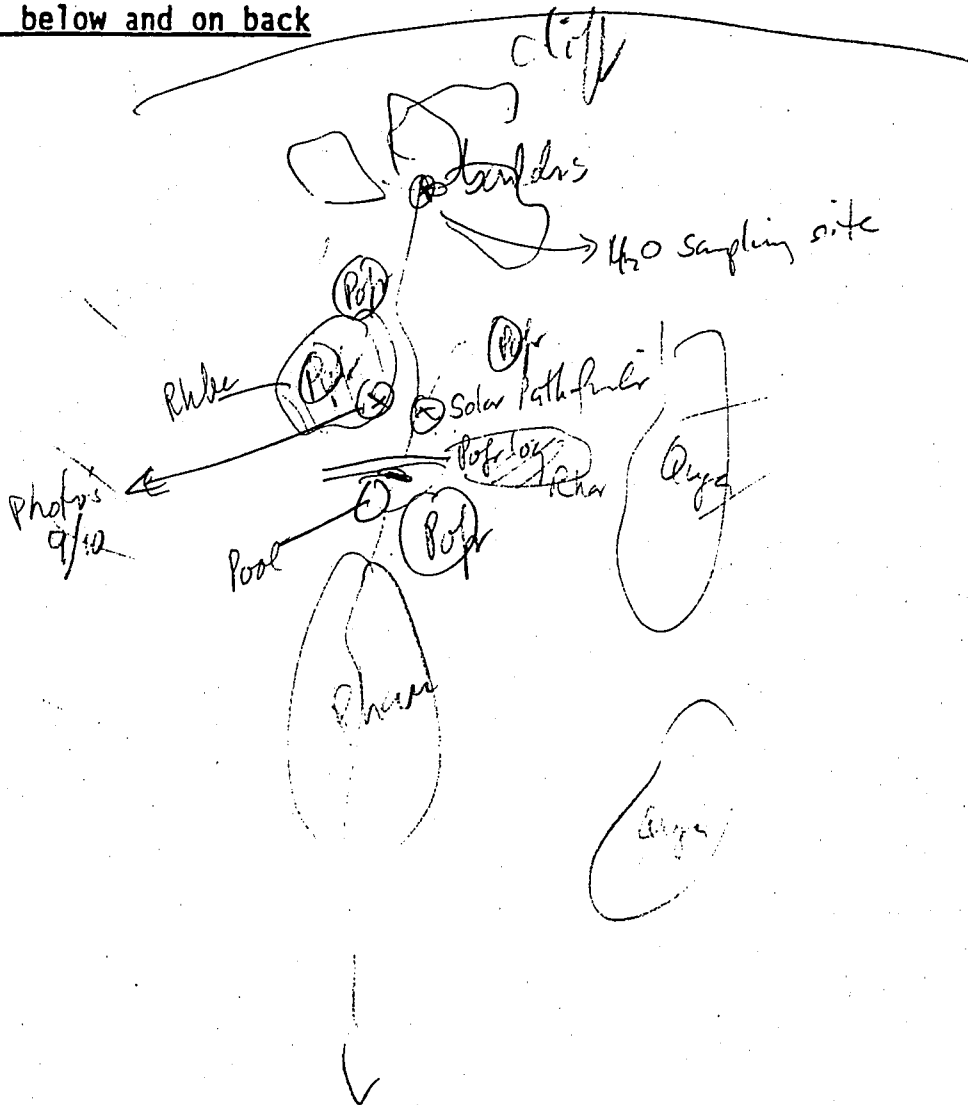
41.0 ml/sec

46.6

**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	Spring	Worker	JS
Location	Gll Bay		
Topo Map	Gll Bay	UTM	545420E 4165730N
Transect/Releve No.	6LCA16-97	Date	8/14/97

Sketches below and on back





**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

<b>Site</b> 6LCA16-97	<b>Date</b> 8/14/97	<b>Workers</b> JS/KB/JL
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Site	Temperature	DO	Conductivity	pH
①	18.4°C	8.0	286	7.91

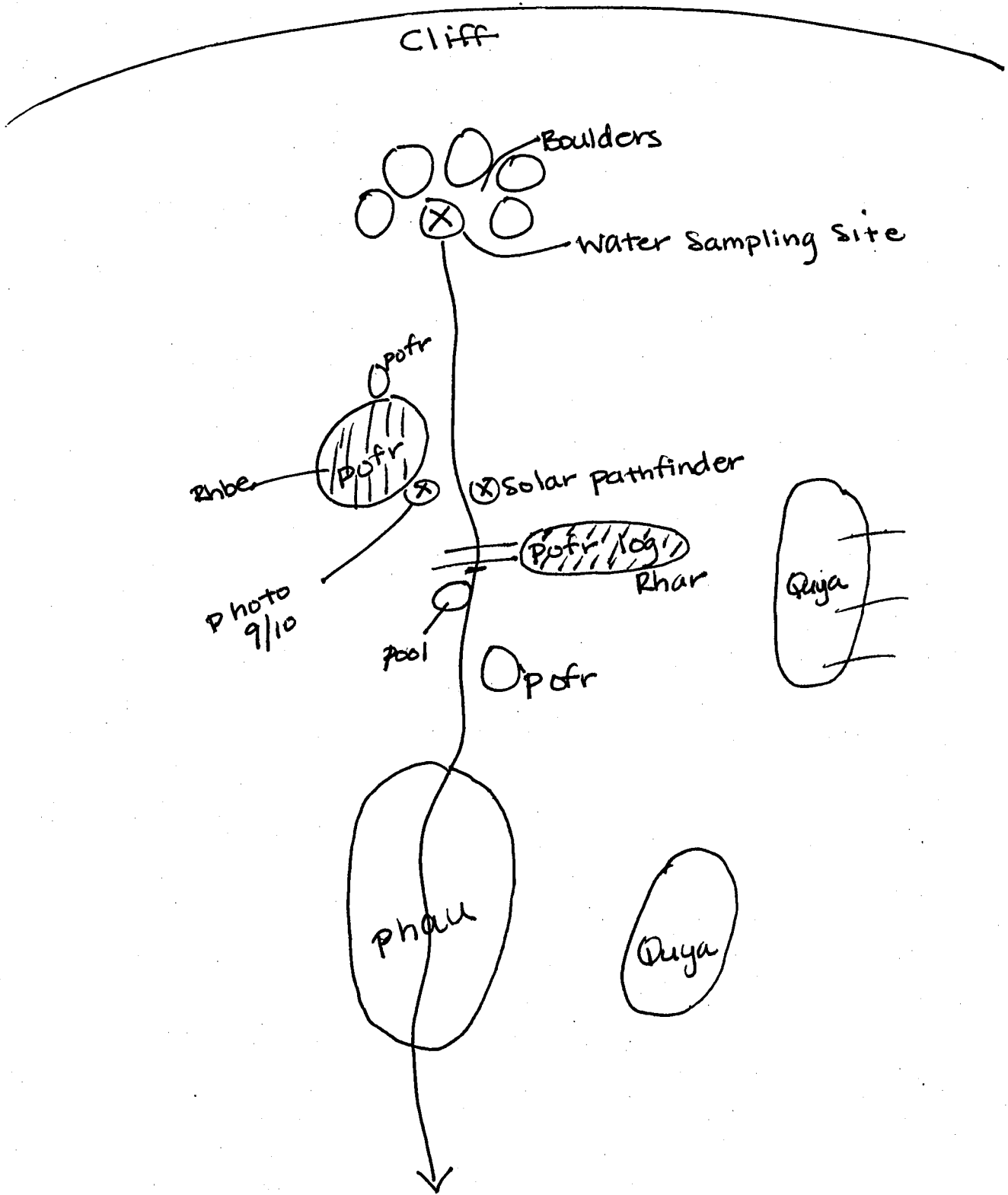
Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
--	--	--	--	--	--	-----------------------	--	--	--

Volume (ml)	Time (sec)	Volume	Time	Volume	Time	Volume	Time	Month	%
① 365	7.69							Jan	0
377	7.03							Feb	0
320	6.35							Mar	14
340	6.53							Apr	54
370	7.21							May	79
								June	85
								Jul	79
								Aug	66
								Sep	28
								Oct	0
								Nov	0
								Dec	0

X = 33.7%



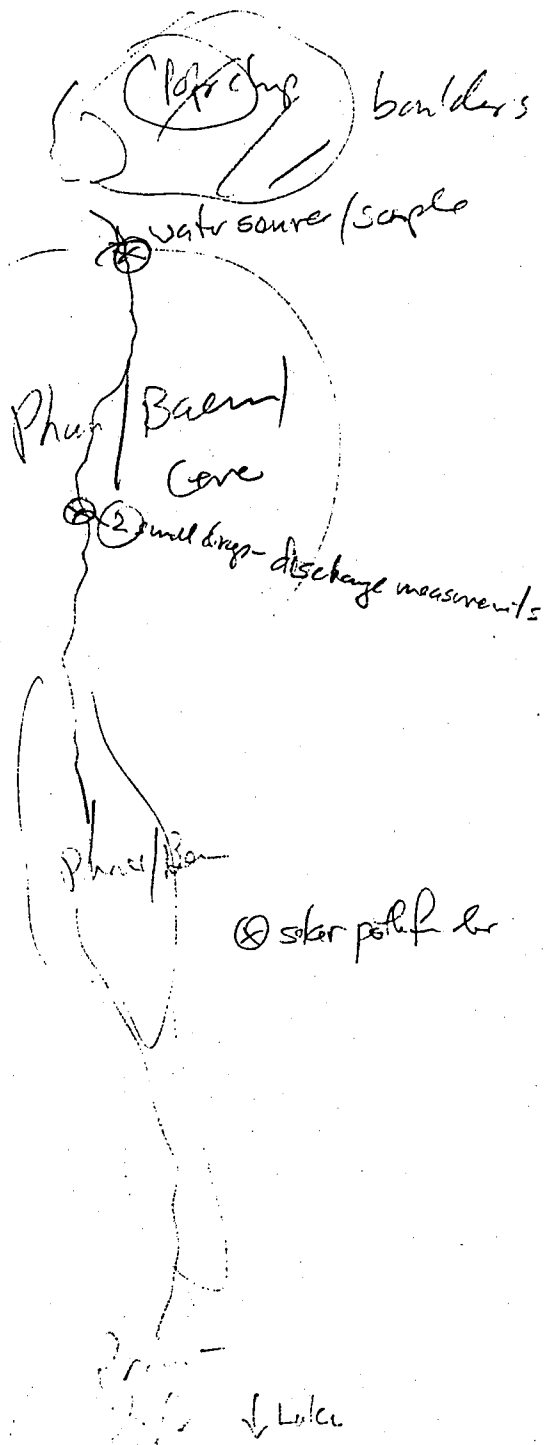
GLCA 16-97  
Good Hope Bay



**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	Spring	Worker	JS   KB   JM   JW   JMD
Location	W spring on 6H Bay		
Topo Map	UTM	545.190E 4165740N	
Transect/Releve No.	6LCA19-97	Date	8/14/97

Sketches below and on back





**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site	GLSA17-97	Date	8/14/97	Workers	BS/KAB
------	-----------	------	---------	---------	--------

Site	Temperature	DO	Conductivity	pH
①	19.3°C	7.3 mg/l	211 µS/cm	8.11

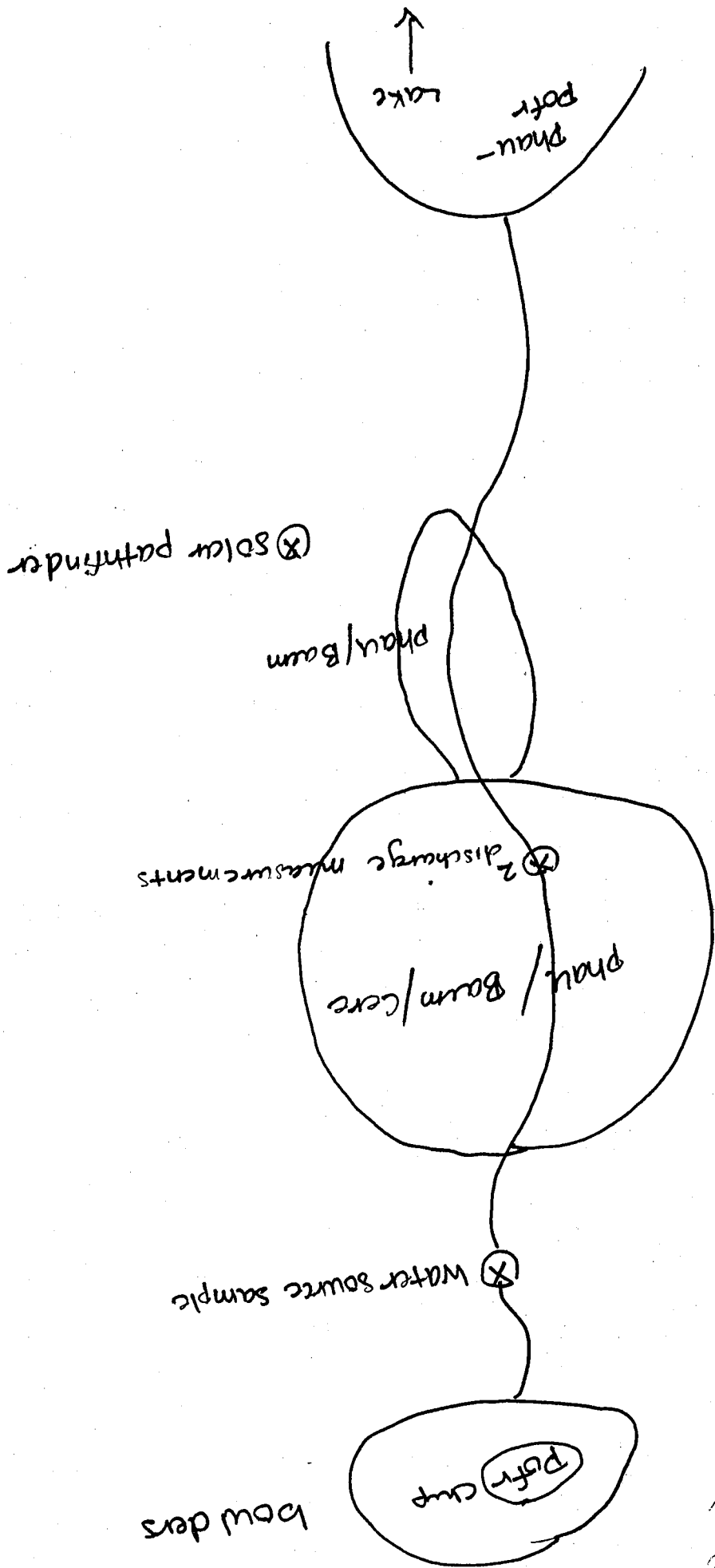
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
--	--	--	--	--	--	--	-----------------------	--	--

Volume ml	Time sec	Volume	Time	Volume	Time	Volume	Time	Month	%
455	1.56	470	1.22	470	1.41	465	1.31	Jan	0
465		465		455		485		Feb	32
470		450		460		470		Mar	75
460		450		485		490		Apr	97
420		420		355		430		May	97
250		120		165		225		June	98
								Jul	98
								Aug	98
								Sep	89
								Oct	37
								Nov	0
								Dec	0

②

AA + <sup>10%</sup> of ②

$\bar{x} = 60.1\%$

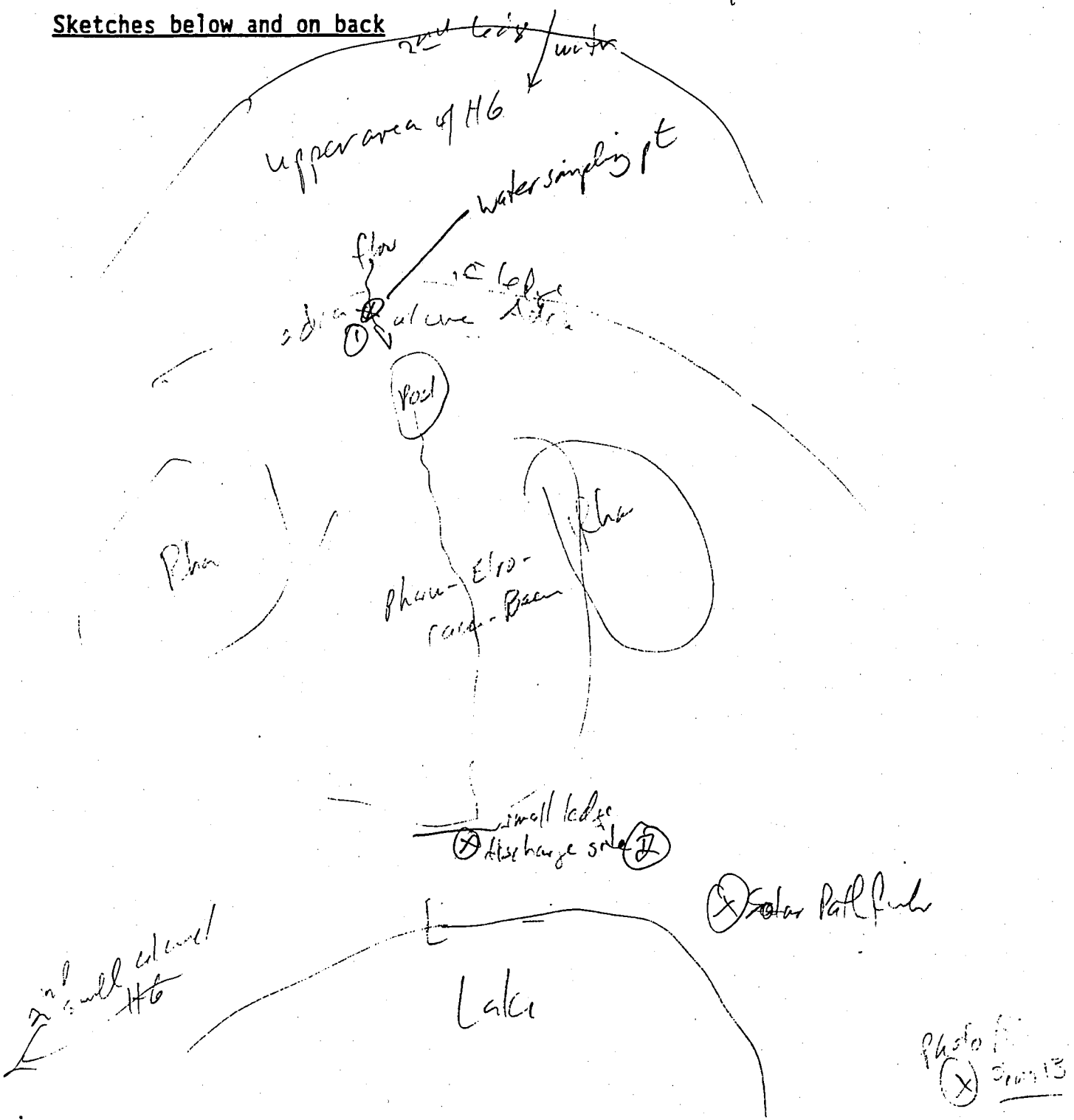


GCA 17-97  
Good Hope Bay

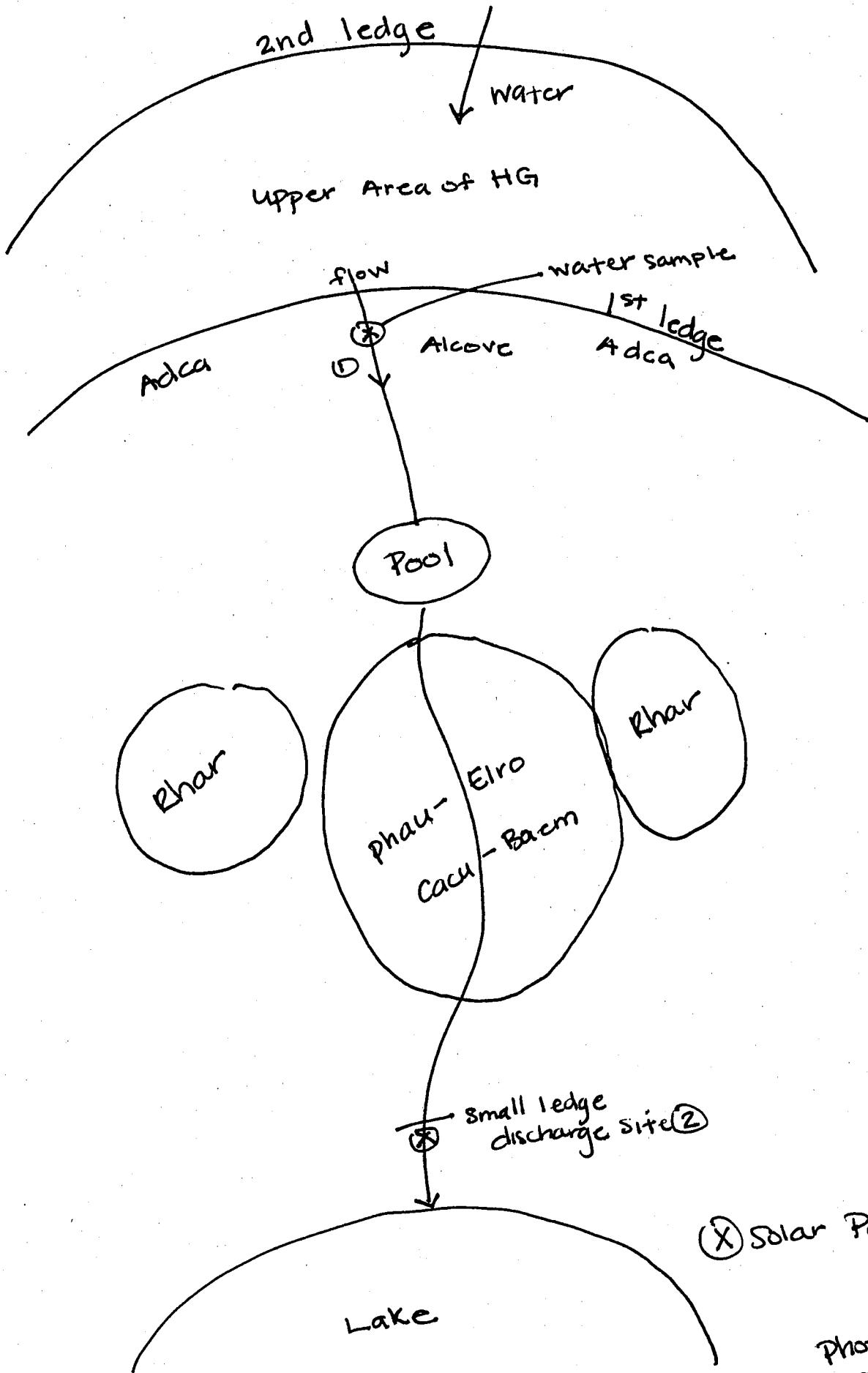
**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	Spring	Worker	JS
Location	1/2 mile down from "Sumac Garden"		
Topo Map	510960E 4132610N	UTM	
Transect/Releve No.	GLCA 18-97	Date	8/15/97

Sketches below and on back



GLCA 18-97  
Near "Sumoc" Gorge



(X) Solar Pathfinder

Photo Pt.  
(X) photo 13

### HANGING GARDEN DATA SHEET

Investigator <i>JS</i>	Date <i>8/15/97</i>	Releve <i>GLCA 18-97</i>	Record		
Garden location <i>46 w of Sumac Garden</i>	Aspect <i>115° mag N</i>	Geology <i>Nuv-Kay interface</i>	Size		
UTM	Distance from drainage	Structure	Elevation	Water flow <i>3.0</i>	Exposure <i>3</i>
Disturbance <i>rockfall, flooding, mostly DS with silt bed in 1st alcove</i>					
Species	General	BW Small	DS	PP	
<i>Ciky</i>		<i>-</i>	<i>U</i>		
<i>Rhbe</i>		<i>U</i>	<i>R</i>		
<i>Cacu</i>		<i>U</i>	<i>U</i>		
<i>Loca</i>		<i>R</i>	<i>O</i>		
<i>Angl</i>		<i>-</i>	<i>O</i>		
<i>Phan</i>		<i>-</i>	<i>U</i>		
<i>Baem</i>		<i>-</i>	<i>U</i>		
<i>Arln</i>		<i>-</i>	<i>O</i>		
<i>Tory</i>		<i>O</i>	<i>U</i>		
<i>Oeel</i>		<i>-</i>	<i>O</i>		
<i>Rhar</i>		<i>-</i>	<i>U</i>		
<i>Soca</i>		<i>-</i>	<i>O</i>		
<i>* Brm</i>		<i>-</i>	<i>R</i>		
<i>Adca</i>		<i>C</i>	<i>O</i>		
<i>Paac</i>		<i>-</i>	<i>O</i>		
<i>Caau</i>		<i>-</i>	<i>O</i>		
<i>Thin</i>		<i>-</i>	<i>O</i>		
<i>Elro</i>		<i>R</i>	<i>U</i>		
<i>* Tail</i>		<i>-</i>	<i>O</i>		



**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

<b>Site</b> 66CA18-97		<b>Date</b> 8/15/67		<b>Workers</b> JS/KB/Jm
<b>Site</b>	<b>Temperature</b>	<b>DO</b>	<b>Conductivity</b>	<b>pH</b>
① Colmire I	23.3	6.9	192	7.79

<b>Water Flow Data (place unit of measurement below Volume)</b>						<b>Solar Pathfinder Data</b>			
---	--	--	--	--	--	------------------------------	--	--	--

Volume (wt)	Time (sec)	Volume	Time	Volume	Time	Volume	Time	Month	%
② 350	9.81							Jan	70
335	8.40							Feb	59
350	7.09							Mar	54
370	8.35							Apr	55
330	7.28							May	56
345	8.30							June	60
355	10.72							Jul	56
345	10.28							Aug	53
								Sep	54
								Oct	57
								Nov	63
								Dec	70

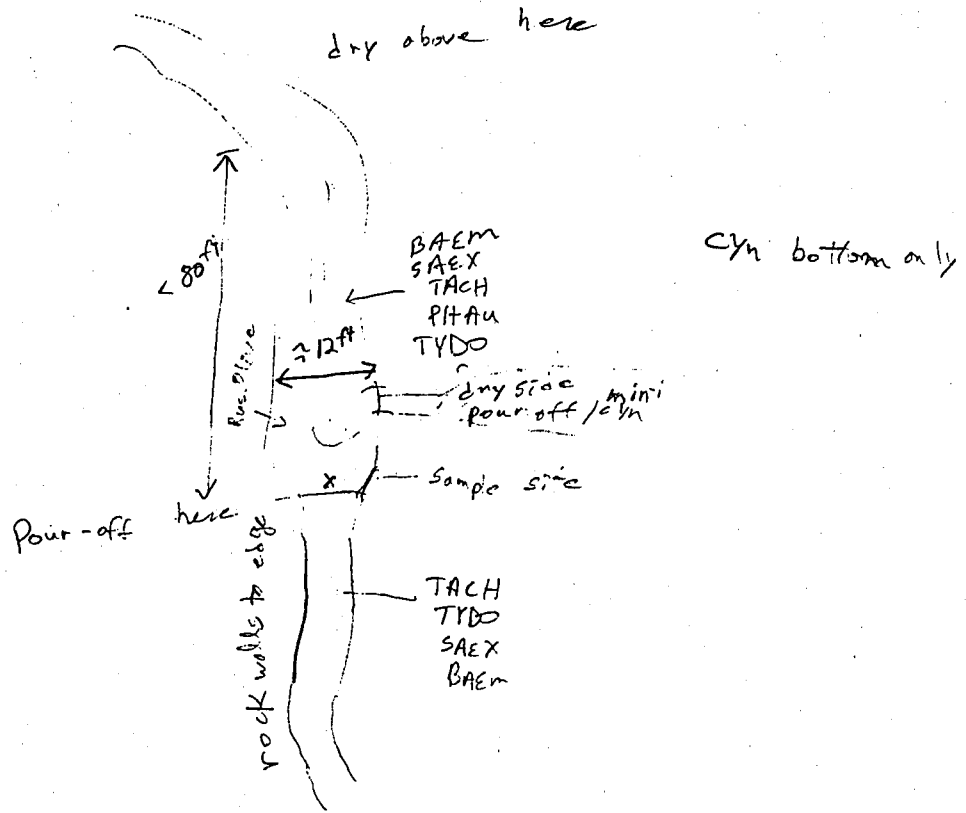
+ 10% of ②

$\bar{X} = 58.9\%$

**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	Worker Mulla
Location	Last Chance Spring - side chn up off Last Chance Creek
Topo Map	12 467100E 4114320N S. of Dunns (approx) UTM
Transect/Releve No.	GLCA 19-97 Date 8-21-97

Sketches below and on back



rock walls  
(some sloping - 40%  
some sheer)  
extend all the  
way to channel

**GLCA RIPARIAN VEGETATION DATA FORM 1**

Map	Location Last chance up Spring	Date 8-21-97	Observers Muller
UTM		GLCA-19-97 Relieve	Elevation
Geomorphology Summer formation Conglomerate rock in a narrow canyon			
Aspect NNE 240 m	Substrate	Terrace	PFI
Exposure	Water	Canyon D	Canyon W
Geology Summer formation			
Disturbance			
Code	Species	Prominence	Collection
1 TYDO		C	
2 SAEX		C	
*TACH		C	
4 BAEM		C	
5 PHAU		C	
6	Russian Olive	R - 1 tree	
7	Skunk bush	R	
8			
9			
10			
11			
12			
13			
14			
15			

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

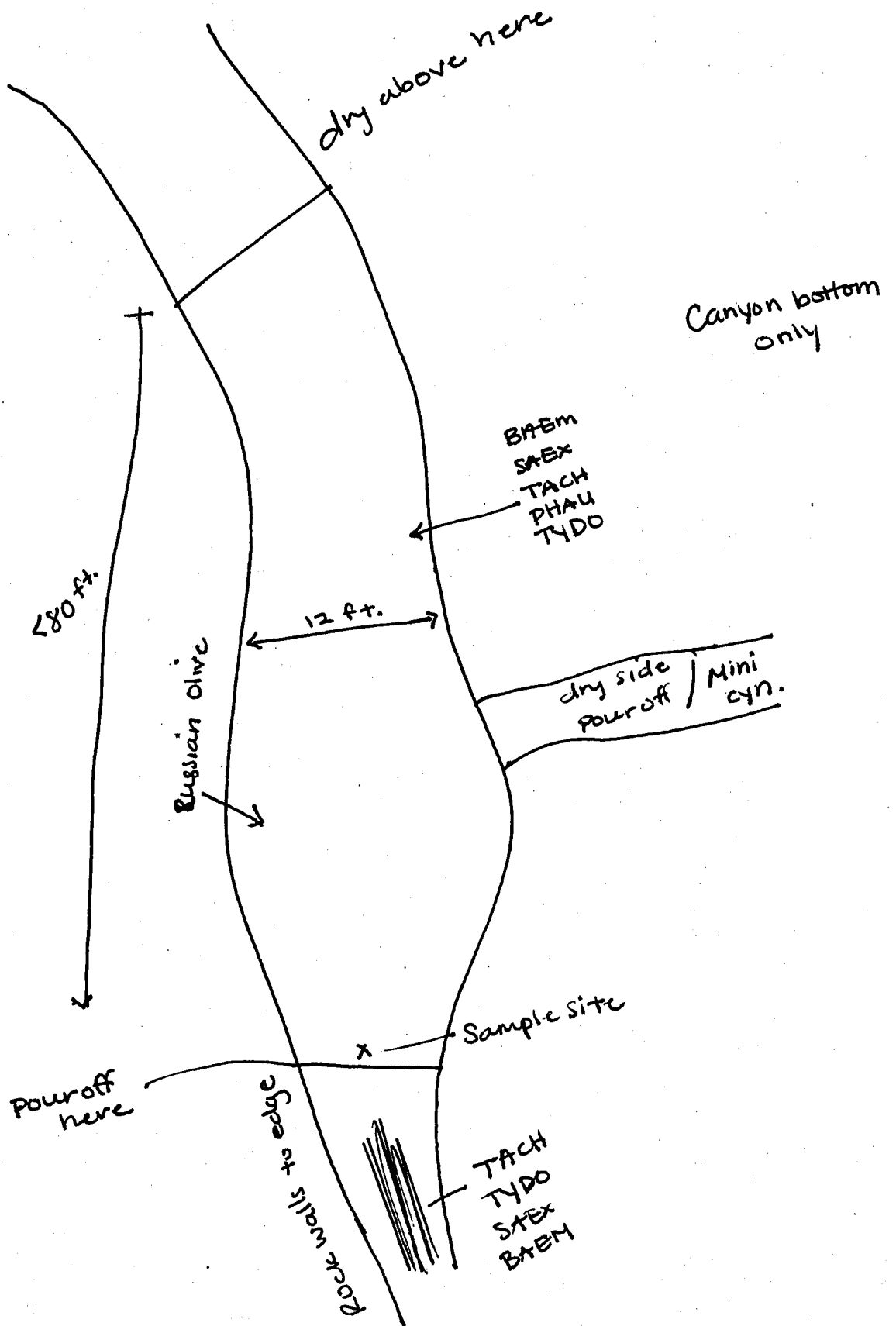
Site <u>GLCA-19-97</u>		Date <u>8/21/97</u>		Workers					
Site	Temperature	DO	Conductivity	pH					
	<u>19.3</u>	<u>6.3</u>	<u>306</u>	<u>8.26</u>					
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	<u>53</u>
								Feb	<u>64</u>
								Mar	<u>66</u>
								Apr	<u>73</u>
								May	<u>69</u>
								June	<u>69</u>
								Jul	<u>69</u>
								Aug	<u>71</u>
								Sep	<u>72</u>
								Oct	<u>66</u>
								Nov	<u>60</u>
								Dec	<u>44</u>

flow =  $\frac{10.4}{\cancel{36}} \text{ m}^3/\text{sec}$

$\bar{X} = 64.7$

GCCA (9-97

Cast Chena Creek



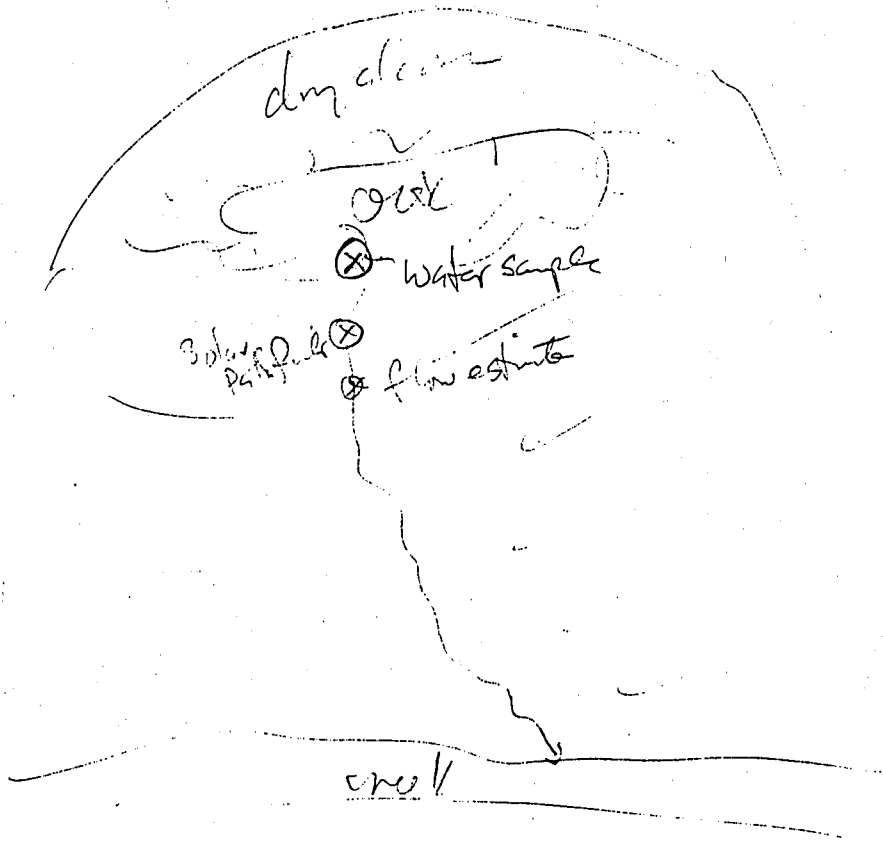
Rock walls  
(some slope - 40%  
some sheer)  
Extend all the way to channel.

TACH  
TYDO  
SAEX  
BAEM

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	Spring	Worker	JM/CM
Location	Forgotten Canyon		
Topo Map	UTM 37°32'30"N 110°34'24"W		
Transect/Releve No.	6LCA20-97	Date	9/4/97

Sketches below and on back



**GLCA RIPARIAN VEGETATION DATA FORM 1**

Map	Location <i>Forgotten Canyon</i>	Date <i>9/4/97</i>	Observers <i>SS</i>
UTM		Relevé <i>GLCA20-97</i>	Elevation
Geomorphology <i>Spring Project</i>			<i>3800</i>
Aspect <i>320° mag</i>	Substrate	Terrace	PFI
Exposure <i>3</i>	Water <i>3.5</i>	Canyon D	Canyon W
Geology <i>Navajo - just above Kayenta</i>			
Disturbance <i>species poor area, flooding</i>			
Code	Species	Prominence	Collection
1	<i>Querc</i>	<i>C</i>	
2	<i>Apru</i>	<i>U</i>	
3	<i>Casc</i>	<i>O</i>	
4	<i>elli</i>	<i>C</i>	
5	<i>Rhar</i>	<i>U</i>	
6	<i>Arhu</i>	<i>O</i>	
7	<i>Cere</i>	<i>O</i>	
8	<i>Brlo</i>	<i>O</i>	
9	<i>Soca</i>	<i>O</i>	
10			
11			
12			
13			
14			
15			

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

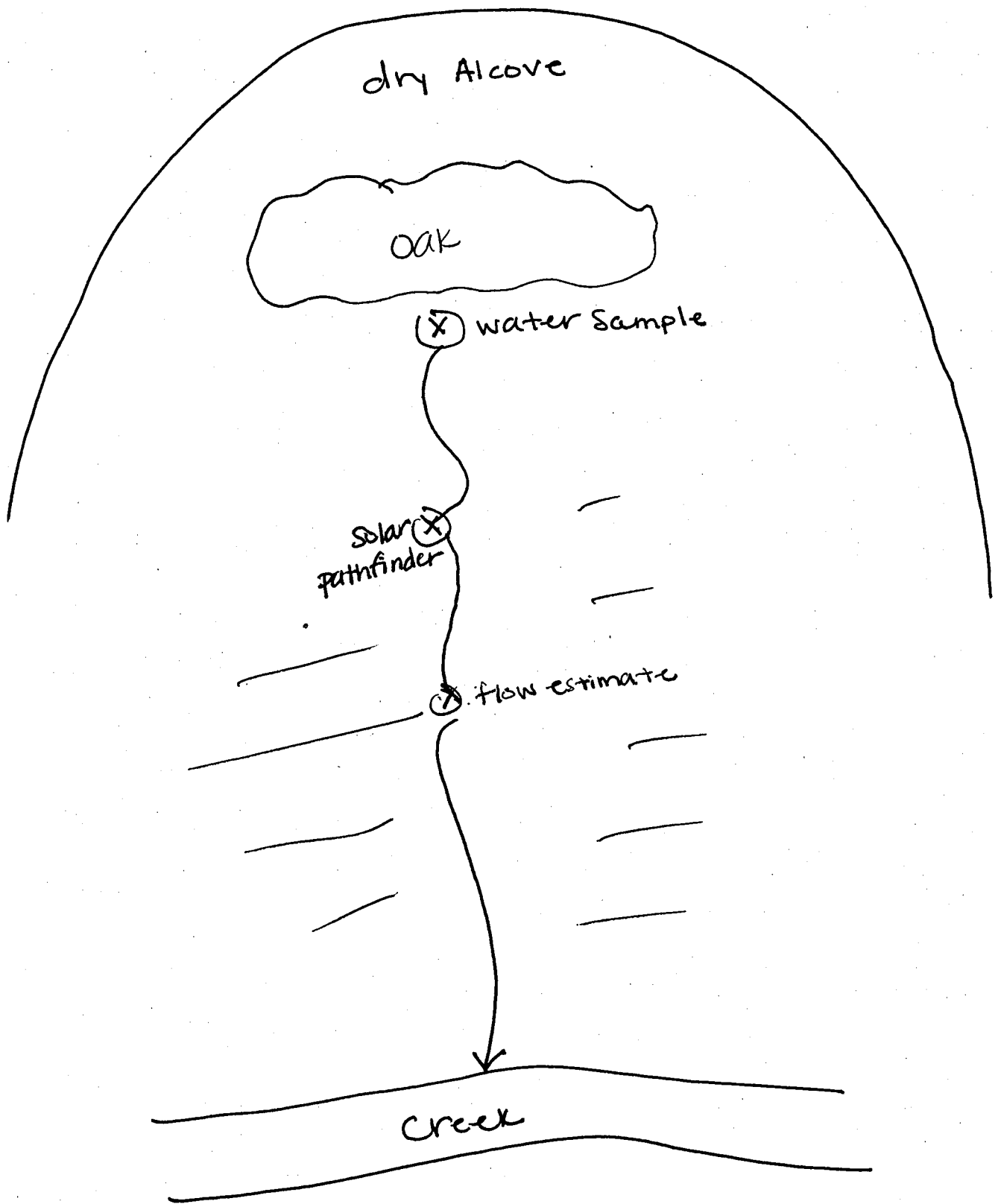
Site 6LCA 20-97				Date 9/4/97		Workers 3 +				
Site	Temperature	DO	Conductivity		pH					
Loring I.	19.3	6.3	306		8.26					
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data			
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%	
								Jan	0	
								Feb	0	
								Mar	4	
								Apr	24	
								May	44	
								June	56	
								Jul	50	
								Aug	30	
								Sep	9	
								Oct	0	
								Nov	0	
								Dec	0	

discharge: 36-9 ml/sec

$\bar{X} = 17.8$



GCLA 20-97 Forgotten Canyon

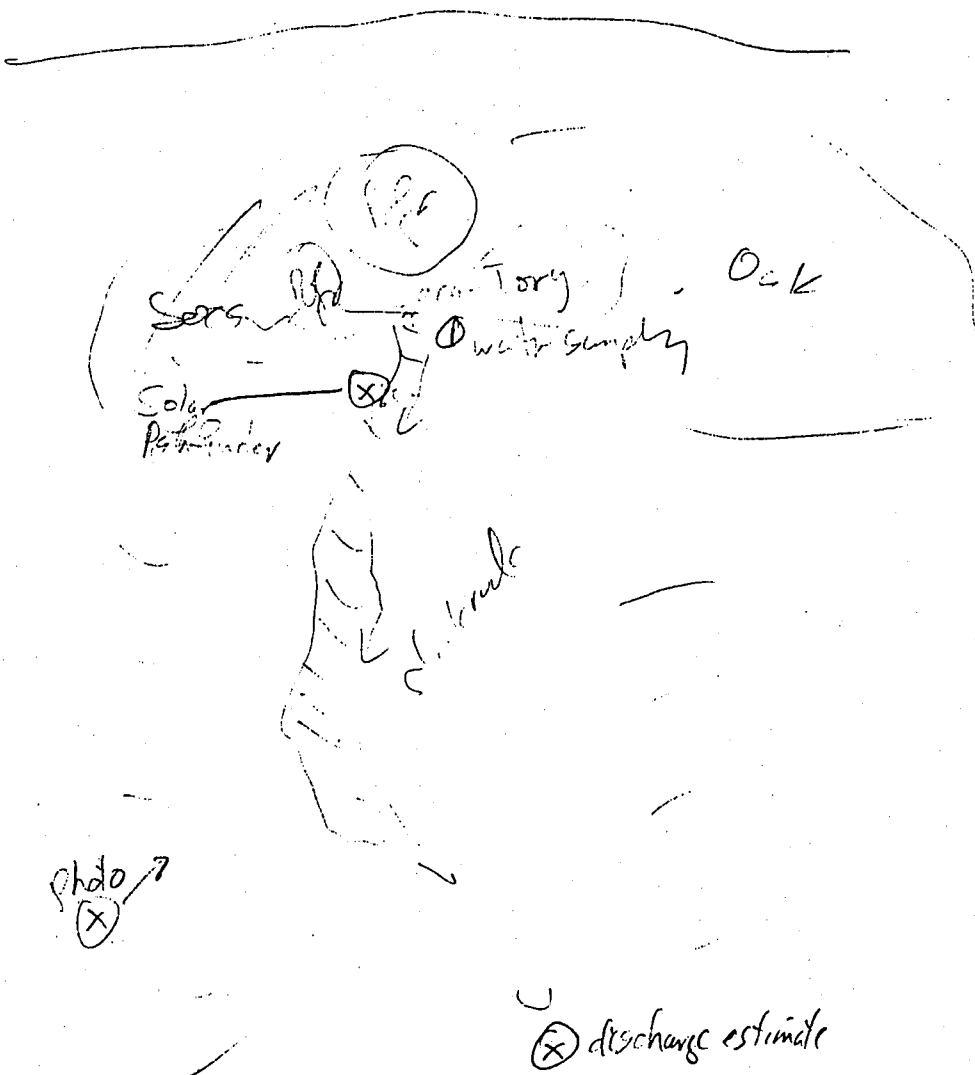


**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	Spring	Worker	JS
Location	Moqui C.		
Topo Map	UTM 37°27.60N / 110°32.92W		
Transect/Releve No.	GLCA-21-97	Date	9/4/97

Sketches below and on back

open, sunny site



**GLCA RIPARIAN VEGETATION DATA FORM 1**

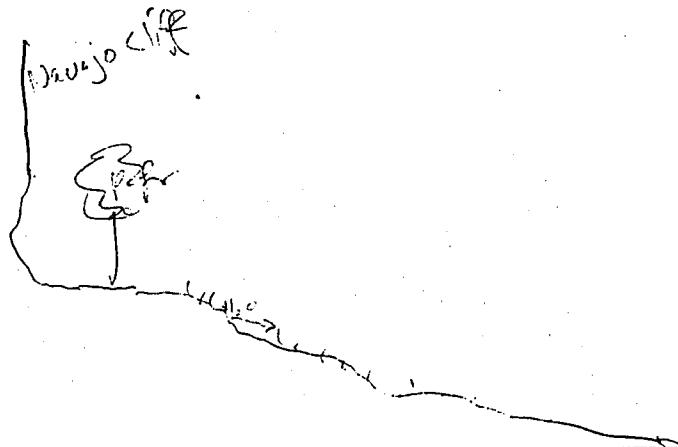
Map	Location Moqui C.	Date 9/4/97	Observers JS
UTM		Relieve <sup>GLCA-21</sup> 97	Elevation
Geomorphology Open seepy slope			
Aspect <del>190°</del> 190° Mag.	Substrate seepy slopes/silt/clay	Terrace	PFI
Exposure 2	Water 4	Canyon D	Canyon W
Geology U. Kanabta ~ or Nav-Kay inter			
Disturbance minor			
Code	Species	Prominence	Collection
1	Soca	u	
2	Toru	u	
3	<del>Poa</del>	u	
4	Quin	0	
5	Lora	0	
6	Anal	u	
7	Juba	0	
8	Juto	0	
9	elli	R	
10	Sosp	0	
11	<del>St</del> Oael	0	
12	<del>Quin</del>	0	
13	Juncus sp. - odd looking = Fimbrystylis sp. pedicea	u	yes!
14	Eggi	R	
15	Adca	R	

**GLCA RIPARIAN VEGETATION DATA FORM 2**

Code	Species	Prominence	Collection
16	Panvir	0	
17	yuto	0	
18*	Pomo	0	
19	Mues	0	
20	Erut	⊙	
21	Typha sp.	⊙R	
22*	Sbas	R	
23			
24			
25			

Stratum	Height	Cover
Tree		
Shrub		
Graminoid		
Forb		
Bryophyte		
Lichen		
Litter		
Soil		
Rock		

**Notes**



small pour-off

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <i>GLCA 21-97</i>		Date <i>9/4/97</i>	Workers <i>JS</i>	
Site	Temperature	DO	Conductivity	pH
<i>① Corning I.</i>	<i>19.8</i>	<i>4.4</i>	<i>397</i>	<i>7.83</i>

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
--	--	--	--	--	--	-----------------------	--	--	--

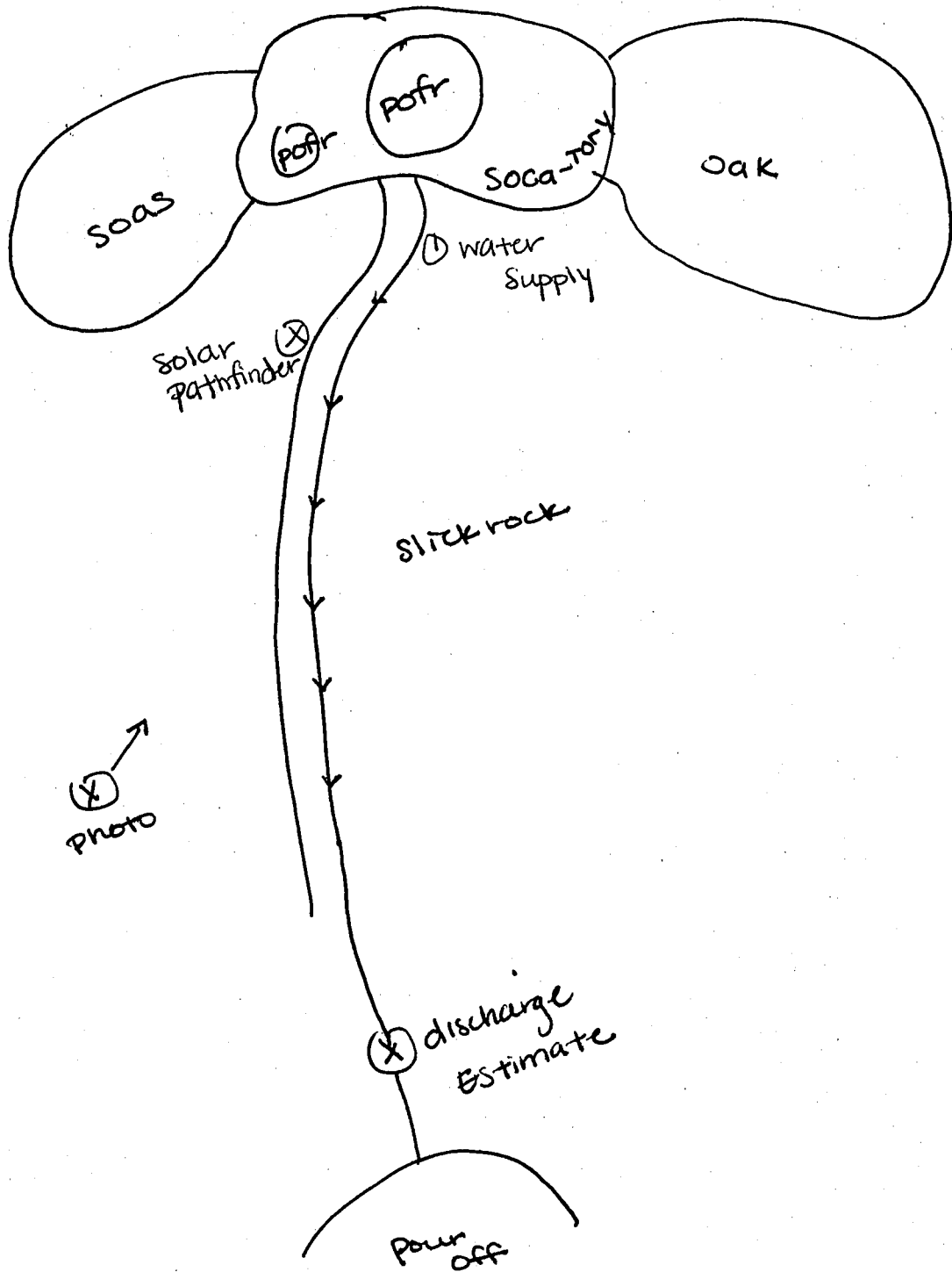
Volume ml	Time sec	Volume	Time	Volume	Time	Volume	Time	Month	%
<i>189</i>	<i>6.04</i>	<i>= 31.3</i>						<i>Jan</i>	<i>96</i>
<i>164</i>	<i>5.22</i>	<i>= 31.4</i>						<i>Feb</i>	<i>98</i>
<i>182</i>	<i>5.65</i>	<i>= 32.2</i>						<i>Mar</i>	<i>96</i>
<i>185</i>	<i>5.65</i>	<i>= 32.7</i>						<i>Apr</i>	<i>95</i>
<i>194</i>	<i>6.16</i>	<i>= 31.5</i>						<i>May</i>	<i>92</i>
								<i>June</i>	<i>92</i>
	<i>x =</i>	<i>31.8</i>						<i>Jul</i>	<i>92</i>
								<i>Aug</i>	<i>94</i>
								<i>Sep</i>	<i>96</i>
								<i>Oct</i>	<i>98</i>
								<i>Nov</i>	<i>97</i>
								<i>Dec</i>	<i>97.</i>

*discharge = 31.8 ml/sec*

*x̄ = 95.3*

GLCA 21-97  
Moqui Canyon

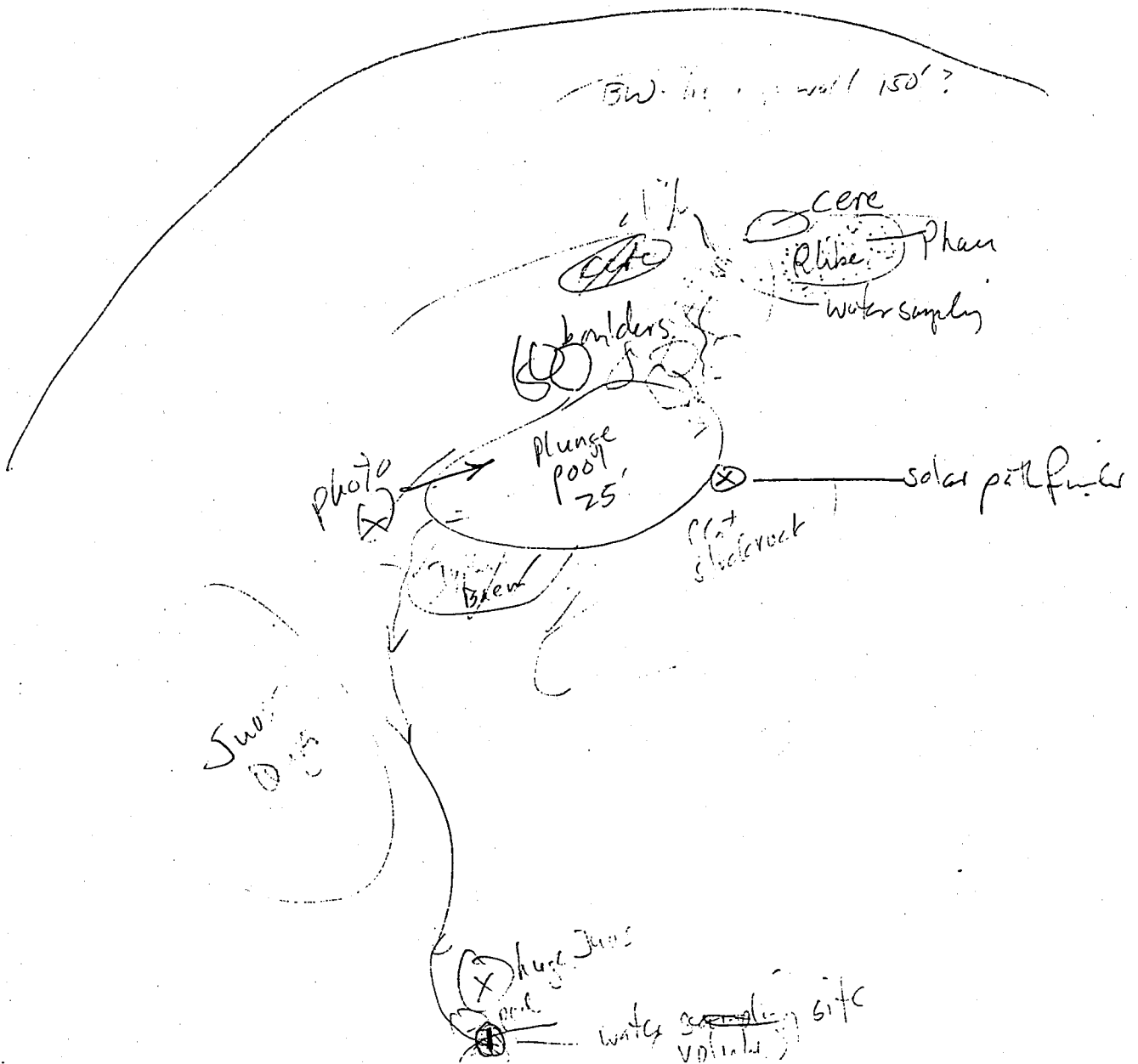
open, sunny site



**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	Spring	Worker	B
Location	Cottonwood Canyon		
Topo Map	UTM 37°13.62'N 110°49.05'W		
Transect/Releve No.	625A-22-97	Date	9/4/97

Sketches below and on back



### HANGING GARDEN DATA SHEET

Investigator <i>JS</i>	Date <i>9/4/97</i>	Releve <i>6LSA22-97</i>	Record	
Garden location <i>Cottonwood Canyon</i>	Aspect <i>170</i>	Geology <i>Navajo</i>	Size	
UTM				
Distance from drainage	Structure <i>classic alcove</i>	Elevation	Water flow <i>3</i>	Exposure <i>3.5</i>
Disturbance <i>rockfall, flooding - recent</i> <i>flood over top hit just below pool, much debris</i> <i>old rattle open abundant</i> <i>no Backwall - had seeping out of DS</i>				
Species	General	BW	DS	PP
<i>Rhac</i>			<i>U</i>	<i>-</i>
<i>Phan</i>			<i>O</i>	<i>R</i>
<i>Epi</i>			<i>R</i>	<i>-</i>
<i>Elv</i>			<i>C</i>	<i>A</i>
<i>Jub</i>			<i>-</i>	<i>O</i>
<i>Adca</i>			<del><i>U</i></del>	<i>-</i>
<i>Vto</i>			<i>R</i>	<i>-</i>
<i>Euec</i>			<i>-</i>	<i>O</i>
<i>Angl</i>			<i>U</i>	<i>O</i>
<i>*Xast</i>			<i>-</i>	<i>O</i>
<i>Pofa in pond (common)</i>			<i>-</i>	<i>4/C</i>
<i>Tudo</i>			<i>-</i>	<i>*O</i>
<i>Arin</i>			<i>O</i>	<i>O</i>
<i>*Soas</i>			<i>-</i>	<i>O</i>
<i>*Pomo</i>			<i>-</i>	<i>O</i>
<i>Acu?</i>			<i>R</i>	<i>R</i>
<i>Panc</i>			<i>O</i>	<i>O</i>
<i>Cere</i>			<i>U</i>	<i>-</i>
<i>Brlo</i>			<i>O</i>	<i>-</i>
<i>Eahy</i>			<i>O</i>	<i>U</i>
<i>Locw</i>			<i>R</i>	<i>R</i>
<i>Sosp</i>			<i>O</i>	<i>R</i>



Species	General	BW	DS	PP
Apeca			R	
P. ca - high on BW		O		
Mica - "		O		
Stte			R	
Baba			R	
Dama			O	
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat				
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
			R	
Comments			O	C
Baem				R
Oeol				R

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

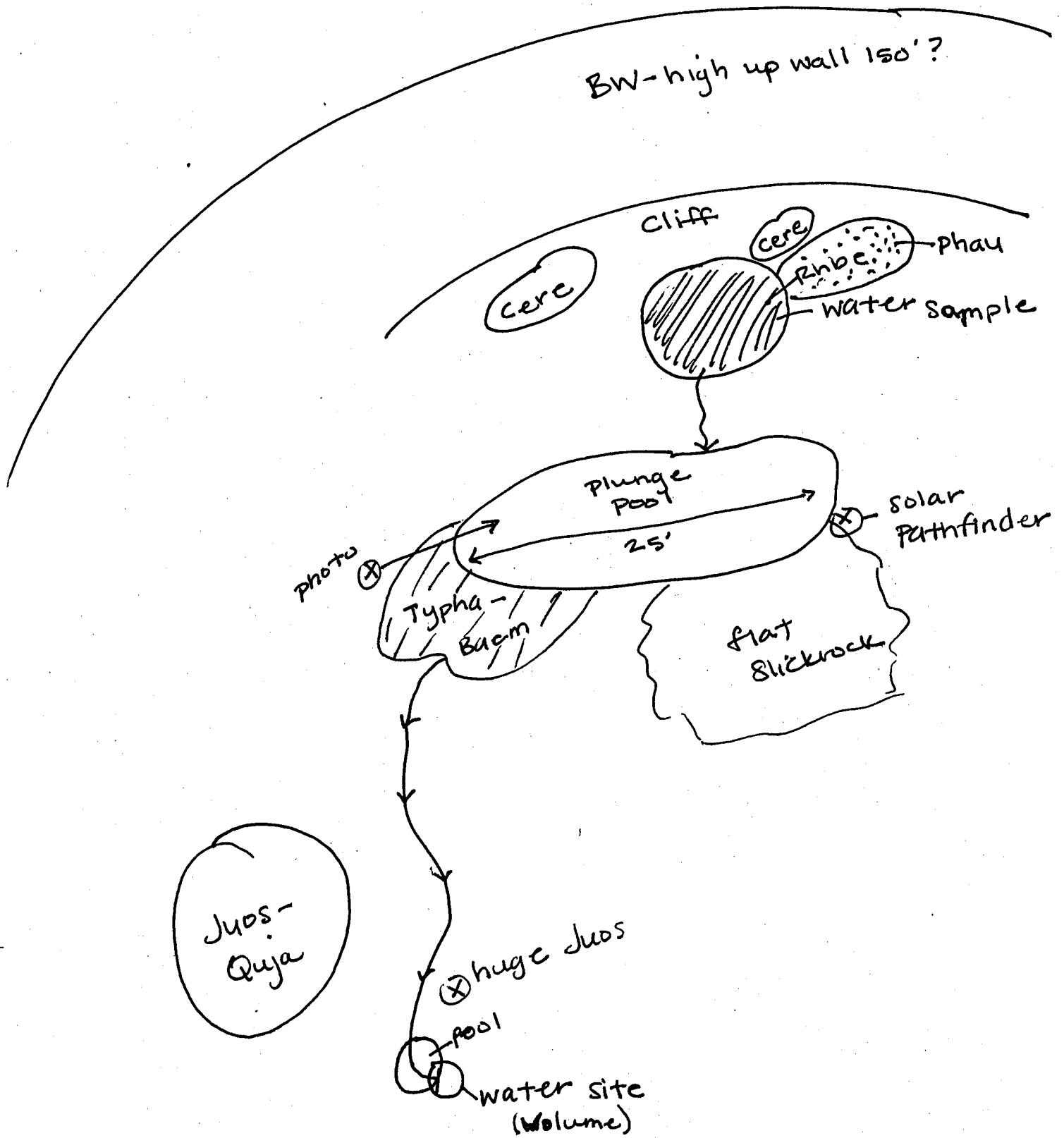
Site <u>GLCA 22-97</u>			Date <u>9/4/97</u>	Workers <u>5 +</u>
Site	Temperature	DO	Conductivity	pH
<u>① Learning</u>	<u>21.0</u>	<u>3.1</u>	<u>216</u>	<u>8.07</u>

Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
<u>520</u>	<u>2.16</u>	<u>= 240.7</u>						<u>Jan</u>	<u>79</u>
<u>520</u>	<u>2.19</u>	<u>= 237.4</u>						<u>Feb</u>	<u>73</u>
<u>490</u>	<u>2.03</u>	<u>= 241.4</u>						<u>Mar</u>	<u>69</u>
<u>470</u>	<u>1.82</u>	<u>= 258.2</u>						<u>Apr</u>	<u>58</u>
<u>495</u>	<u>1.97</u>	<u>= 251.3</u>						<u>May</u>	<u>58</u>
								<u>June</u>	<u>63</u>
	<u>√</u>	<u>= 245.8</u>						<u>Jul</u>	<u>58</u>
								<u>Aug</u>	<u>56</u>
								<u>Sep</u>	<u>69</u>
								<u>Oct</u>	<u>73</u>
								<u>Nov</u>	<u>81</u>
								<u>Dec</u>	<u>78</u>

$\bar{x} = 67.9$

GCCA 22-97  
Cottonwood Canyon

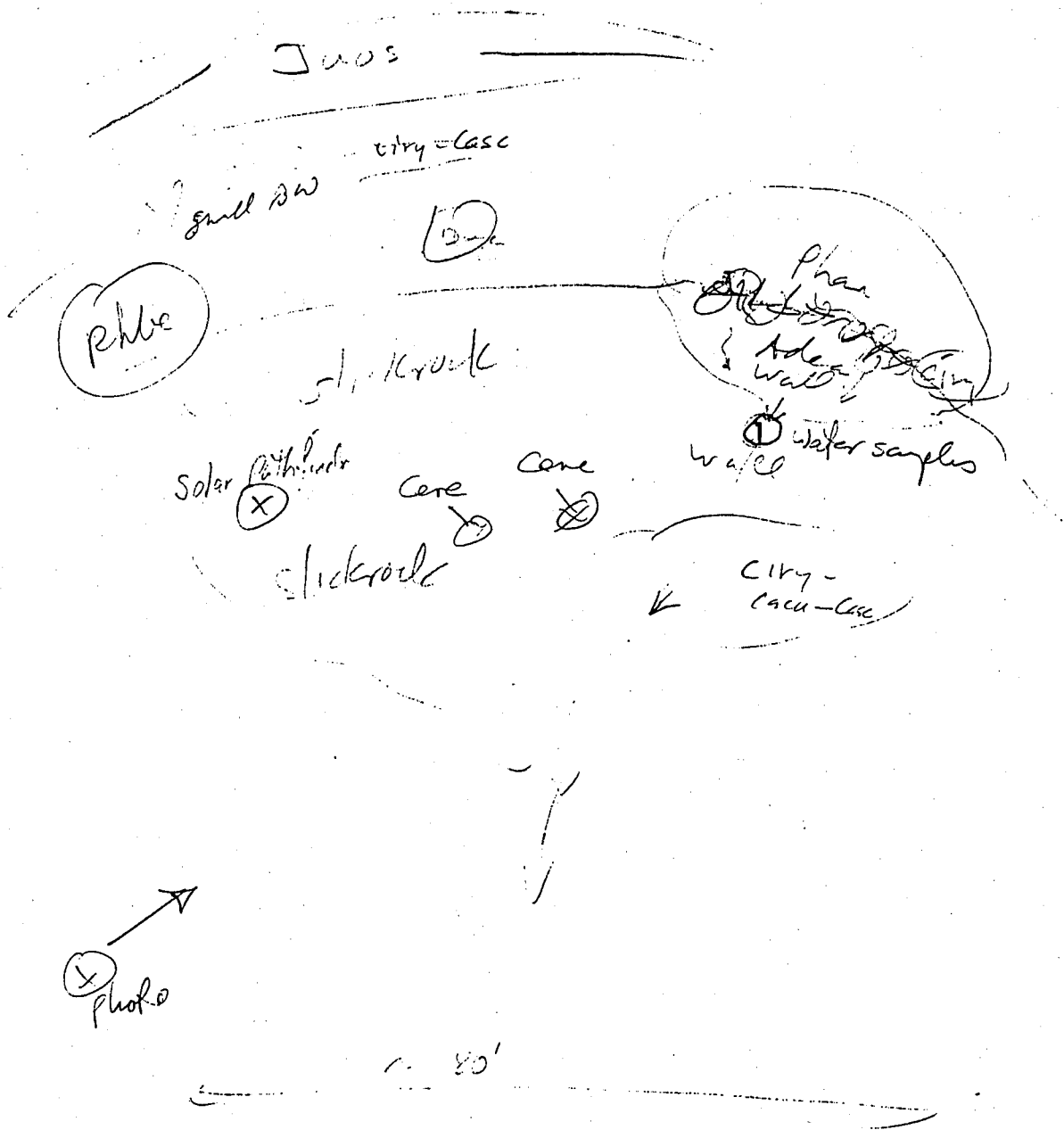
BW-high up wall 150'?



**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	Spring	Worker	JB / LR / CW
Location	near Stevens Arch		
Topo Map	UTM	37° 2.5.48N 110° 58.25W	
Transect/Releve No.	6LCA-23-97	Date	9/5/97

Sketches below and on back



GLCA RIPARIAN VEGETATION DATA FORM 1

Map	Location Un. Naval - S of Stevens Canyon on RL	Date 9/5/97	Observers JS
UTM	Releve GLCA23		Elevation 97 4100'
Geomorphology			
Aspect 240 mag	Substrate	Terrace	PFI
Exposure 3	Water 2	Canyon D	Canyon W
Geology - Kayenta water seeping out in upper Kayenta			
Disturbance rockfall, deer			
Code	Species	Prominence (R <sub>1</sub> )	Collection
1	Poac	O	O
2	Sasp	O	O
3	Ciru	C	C
4	Cere	R	O
5	MiTh	-	O
6	Pacu	C	O
7	Casc	C	U
8	Adca	U	O
9	Phau	O	O
10	Rhbe	U	O
11	Tony	<del>O</del> -	O
12	Adca	<del>R</del> -	R
13	Egji	R	O
14	Panvir	-	O
15	*Pomo	-	R

**GLCA RIPARIAN VEGETATION DATA FORM 2**

Code	Species	Prominence <sup>BW</sup>	Collection <sup>DS</sup>
16	Peca	U	-
17	Prsp	O	-
18	Cali	R	-
19	Qua	-	U
20	Radu	O	O
21	Wich	R	-
22			
23			
24			
25			

Stratum	Height	Cover
Tree		
Shrub		
Graminoid		
Forb		
Bryophyte		
Lichen		
Litter		
Soil		
Rock		

**Notes**

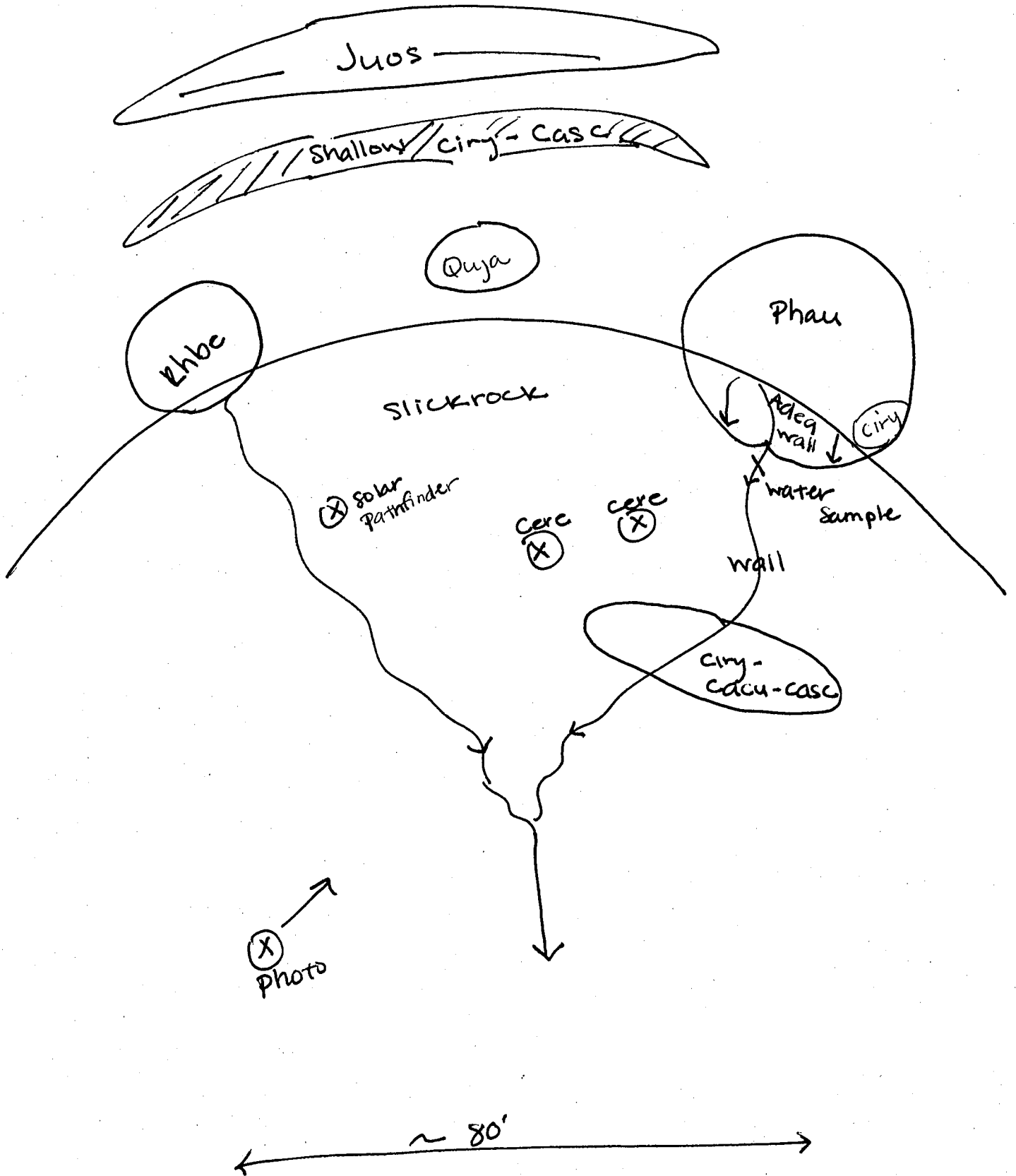
deer sign  
minor rockfall

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <i>GLCA 23-97</i>			Date	Workers					
Site	Temperature	DO	Conductivity	pH					
<i>① Corning I.</i>	<i>8.17</i>	<i>6.8</i>	<i>183</i>	<i>8.17</i>					
	<i>22.3</i>								
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
<i>too low</i>								Jan	<i>42</i>
<i>&lt; 10 ml/sec</i>								Feb	<i>42</i>
								Mar	<i>50</i>
								Apr	<i>50</i>
								May	<i>50</i>
								June	<i>50</i>
								Jul	<i>50</i>
								Aug	<i>49</i>
								Sep	<i>50</i>
								Oct	<i>41</i>
								Nov	<i>40</i>
								Dec	<i>24</i>

$\bar{x} = 44.8$

GLEA 23-97  
Near Stevens Arch  
Escalante River



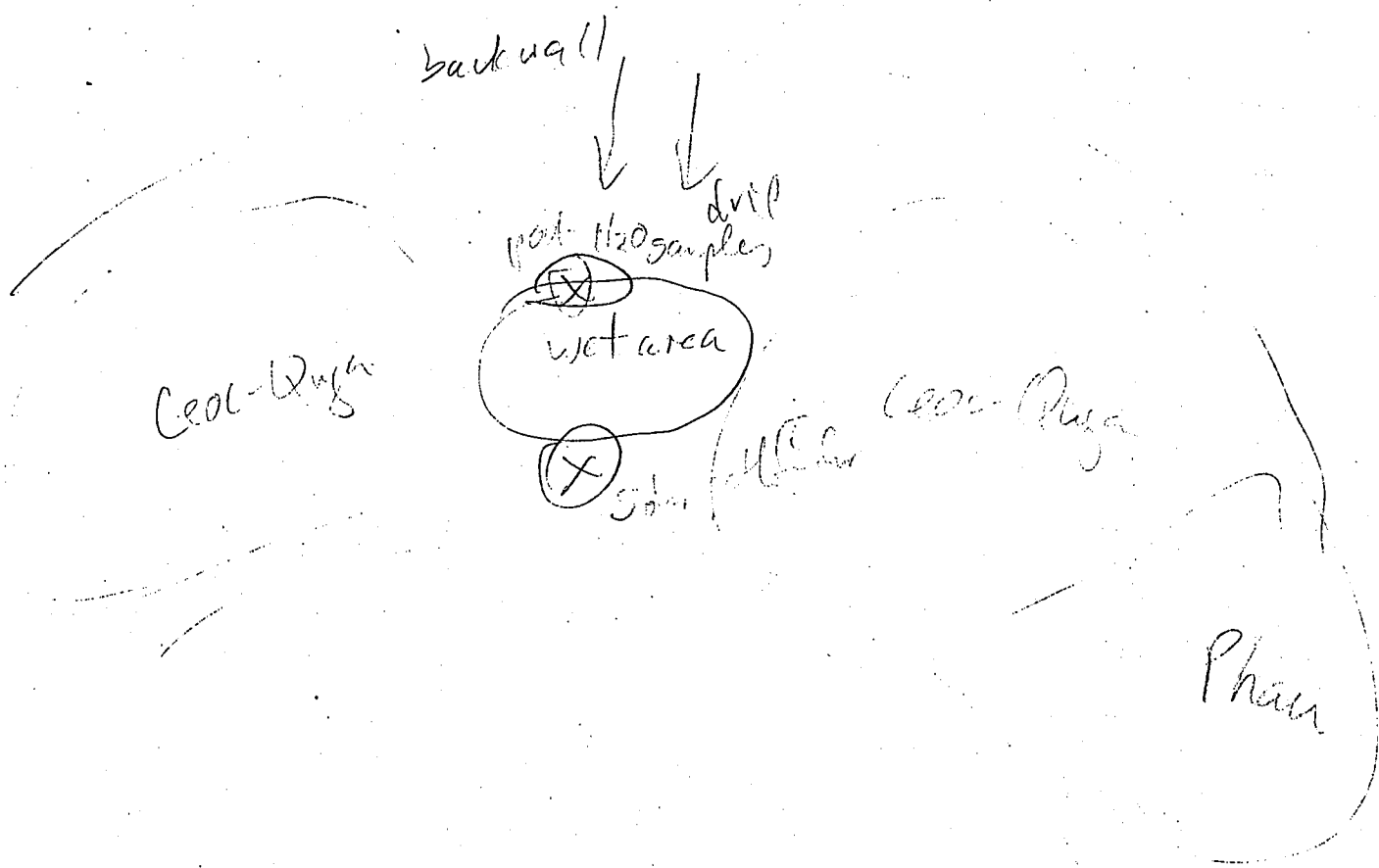


51-98  
~~48-98~~

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	JS
Location	Knowles C. burnt garden		
Topo Map	538240E 4159420N	UTM	
Transect/Releve No.	6LEA-98-01	Date	8/4/98

Sketches below and on back



### HANGING GARDEN DATA SHEET

Investigator <i>JS</i>	Date <i>8/4/98</i>	Releve <i>CLCA98-01</i>	Record
Garden location <i>Knowles C burnt #6</i>	Aspect <i>220° mag N</i>	Geology <i>Nav- Kang 2</i>	Size
UTM	Structure <i>classic stepped</i>	Elevation	Water flow <i>2.0</i>
Distance from drainage			Exposure <i>3.5</i>
Disturbance			
Species	General	BW	DS
<i>Leoc</i>			<i>A</i>
<i>Duca</i>			<i>C</i>
<i>JWba</i>			<i>U</i>
<i>Adca</i>		<i>0</i>	<i>U</i>
<i>Phan</i>			<i>U</i>
<i>Tail</i>			
<i>Agse (awned)</i>			<i>U</i>
<i>Mhu</i>			<i>0</i>
<i>Ciry</i>			<i>0</i>
<i>AgDsp on BW</i>		<i>0</i>	<i>-</i>
<i>Wiel</i>		<i>U</i>	<i>-</i>
<i>Loca</i>		<i>0</i>	<i>0</i>
<i>Brp</i>		<i>-</i>	<i>U</i>
<i>Tach</i>		<i>-</i>	<i>0</i>
<i>Arlu</i>		<i>-</i>	<i>0</i>
<i>Paac</i>		<i>0</i>	<i>-</i>
<i>Brru</i>			<i>0</i>

*DS very patchy. either very low*

GCCA 01-98

Knobles Canyon

Dec 68  
Jan 70  
Nov 67  
Feb 75  
Oct 58  
Mar 57  
Sep 57  
Apr 49  
Aug 49  
May 46  
Jul 40  
Jun 40

65.8

46.8

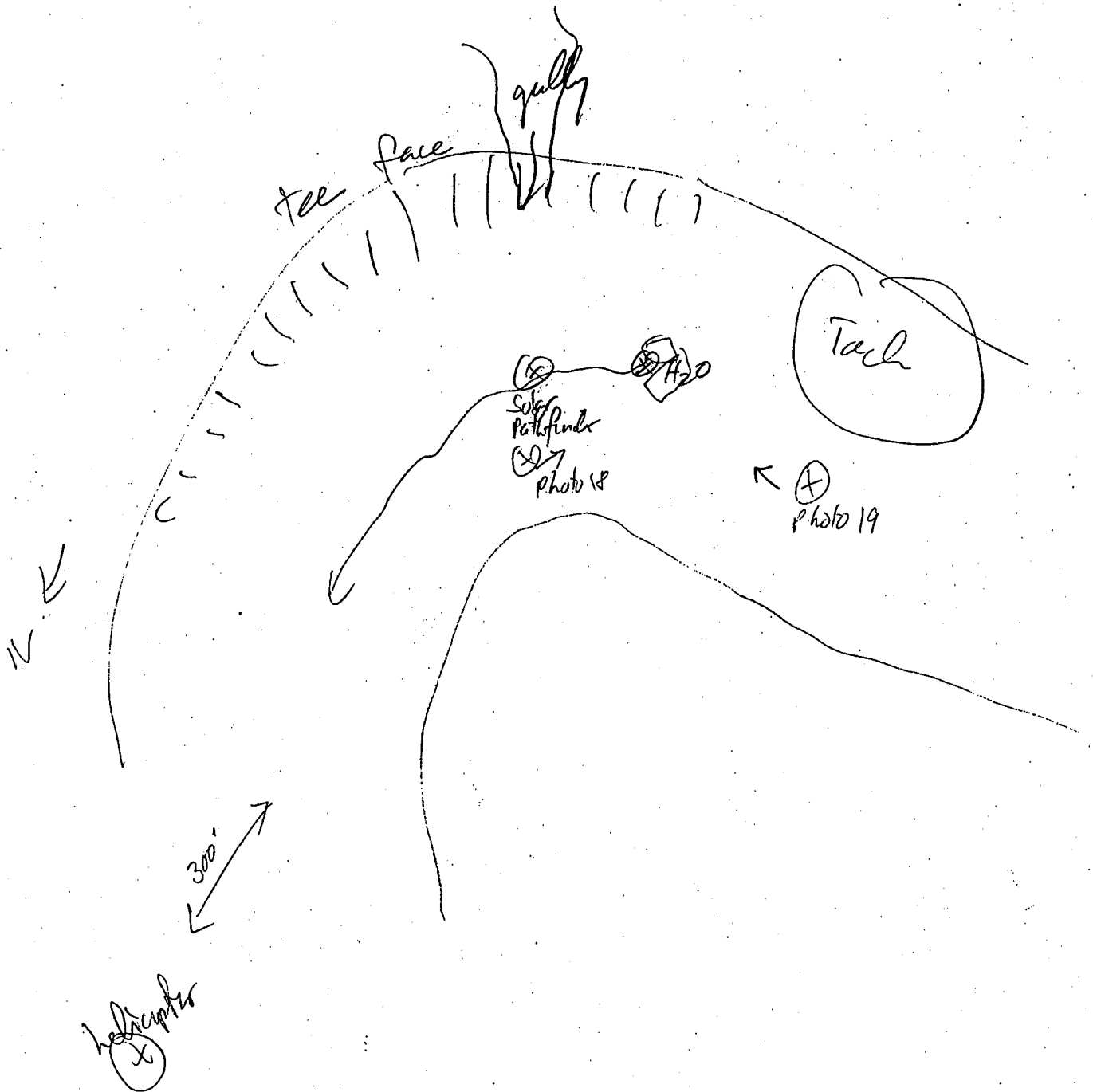
Total = 56.3

92-98  
92

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	JS
Location	Gyp Canyon		
Topo Map	38° 0' 41" N 110° 3' 47" W	UTM	
Transect/Releve No.	GLCA98-02	Date	8/5/98

Sketches below and on back





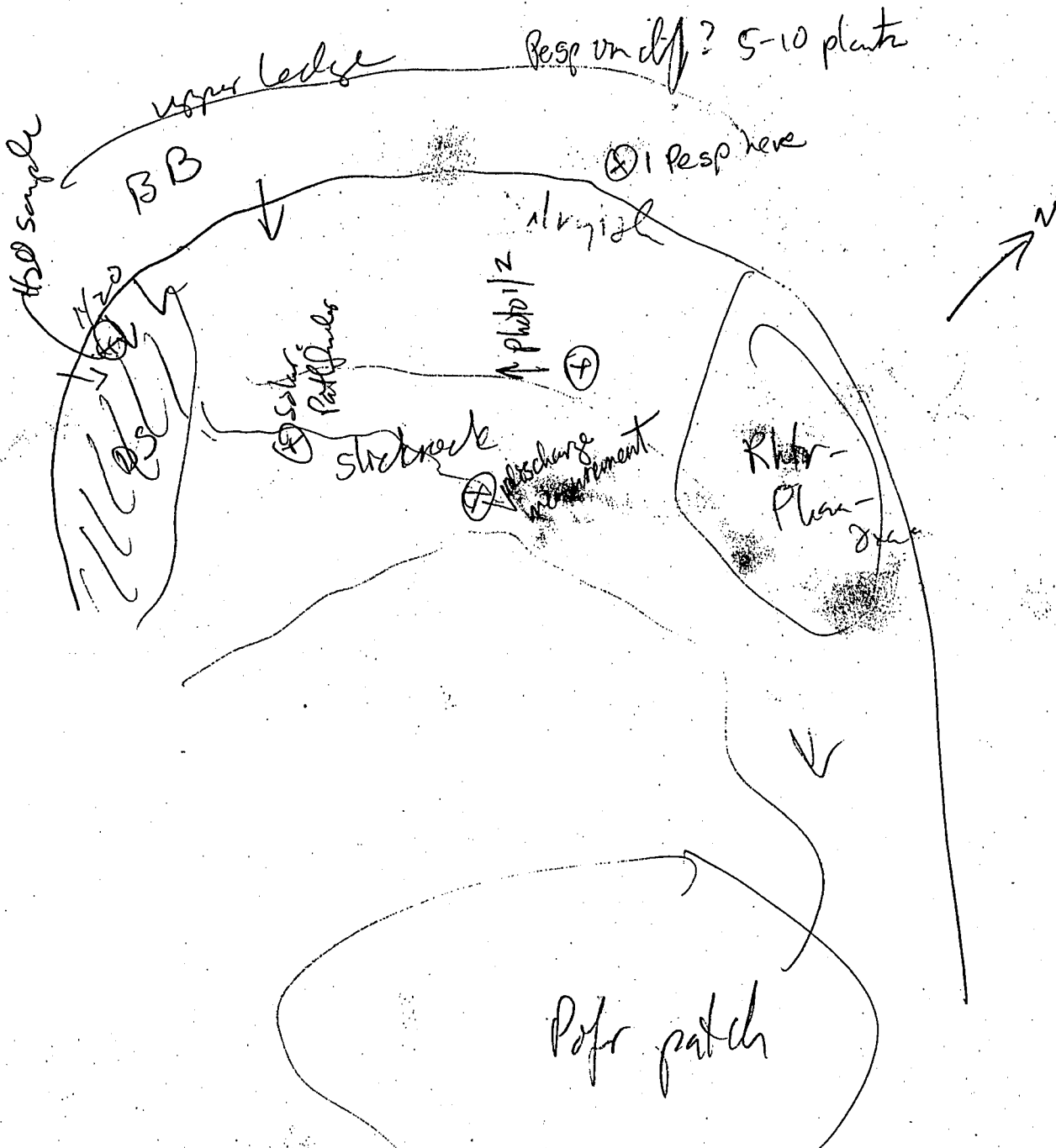
Dec	97		
Jan	96		
Nov	97		
Feb	96	96	
Oct	96		
Mar	94		95.6
<hr/>			
Sep	94		
Apr	95		
Aug	97	95.2	
May	95		
July	95		
Jun	95		

53-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	JS
Location	Easter Pasture Canyon -		
Topo Map	Teapot Rock	UTM	12E 578180N 4208940
Transect/Releve No.	GLCA 98-03	Date	8/5/98

Sketches below and on back



### HANGING GARDEN DATA SHEET

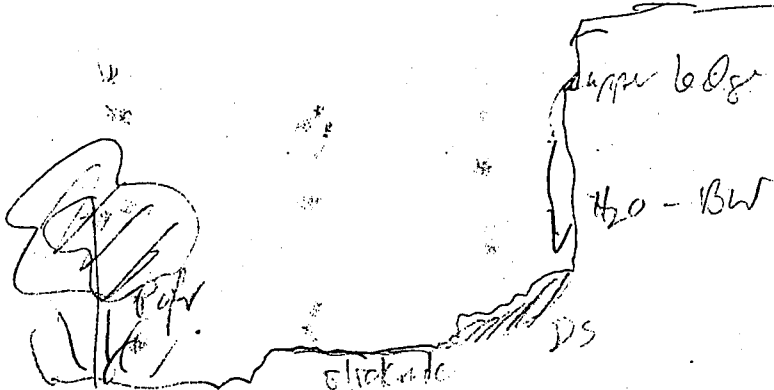
Investigator <i>JS</i>	Date <i>2/5/92</i>	Releve <i>GLCA98-133</i>	Record	
Garden location <i>mid-upper part of Easter Pasture Canyon, Cataract C.</i>	Aspect <i>110° mag N</i>	Geology <i>Cedar Mesa</i>	Size <i>small &lt; 50m²</i>	
UTM	Distance from drainage <i>&gt; 1 mi</i>	Structure <i>21 ft CW</i>	Elevation	
	Water flow <i>2.5</i>	Exposure <del>2.5</del> <i>2.5</i>		
Disturbance <i>flash floods, rock fall, bighorn S.</i>				
Species	General	BW	DS	PP
<i>Ciny</i>				
<i>Oxal</i>				
<i>Pasp</i>				
<i>Cacu</i>				
<i>Erpogi</i>				
<i>Ps. speculicola</i>				
<i>Phan</i>				
<i>Sahu</i>				
<i>Potr</i>				
<i>Caex</i>				
<i>Arpca</i>				
<i>Chl</i>				
<i>Caau</i>				
<i>Brlo</i>				
<i>Rhtr</i>				
<i>Scps</i>				
<i>SASP</i>				
<i>Loca</i>				
<i>Tudo</i>				
<i>Adca</i>				
<i>Eaha</i> (single stand)				
<i>Juba</i>				
<i>Arln</i>				



Species	General	BW	DS	PP
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat				
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
Comments				

BW=backwall, DS=detritus slope, PP=plunge pool  
 COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
 U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

*helix pta*



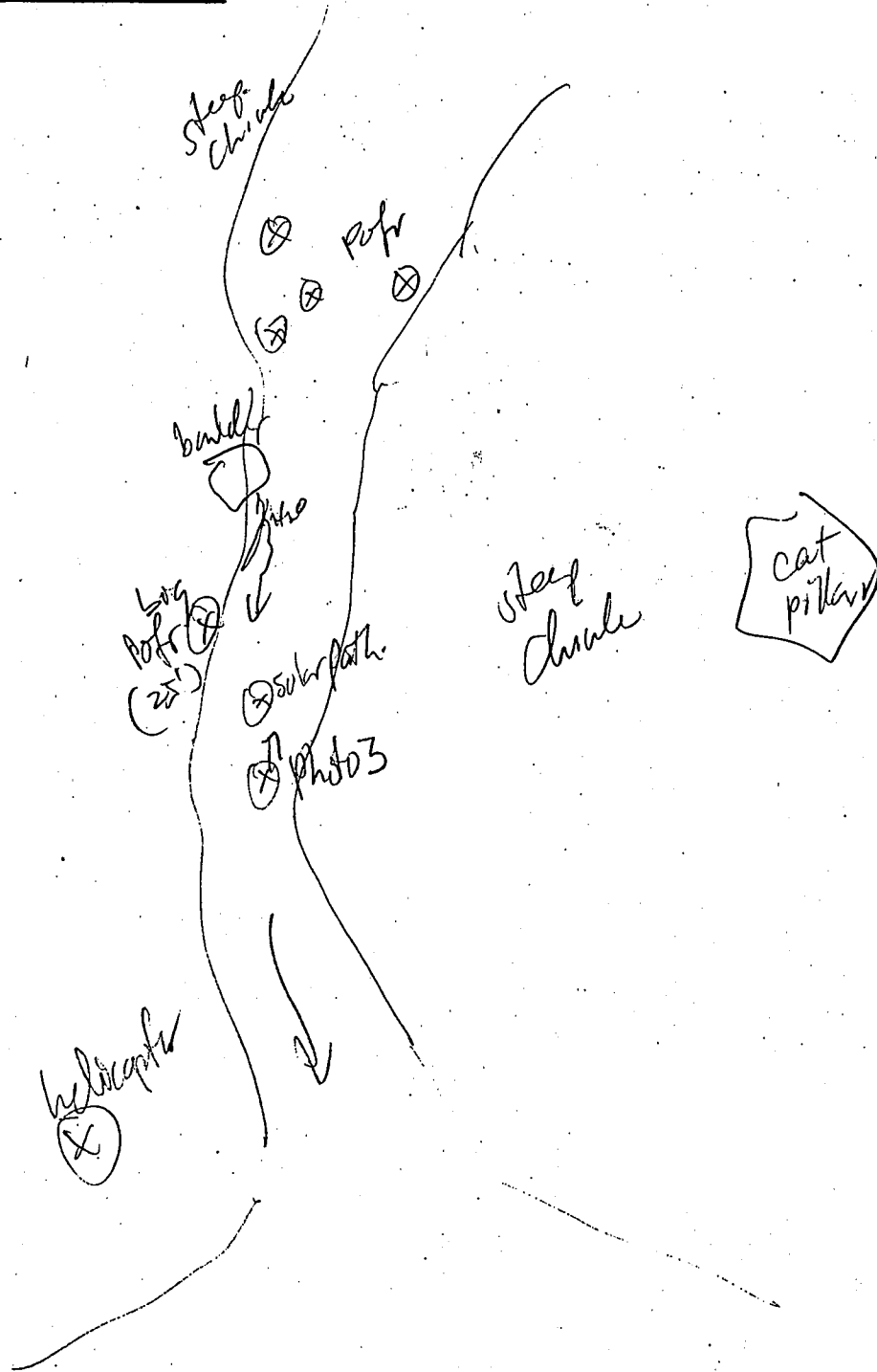
Dec	51	
Jan	51	
Nov	49	
Feb	66	59.3
Oct	70	
Mar	69	
<hr/>		
Sep	69	60.9
Apr	64	
Aug	62	62.5
May	60	
Jul	60	
Jun	60	

5A98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

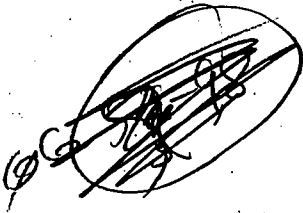
Project	SJP	Worker	JS
Location	Sweet Canyon		
Topo Map	543670E 4186860N	UTM	
Transect/Releve No.	6LCA98-05	Date	8/5/98

Sketches below and on back





Dec	44	
Jan	44	
Nov	43	
Feb	41	44
Oct	40	
Mar	52	
<hr/>		
Sep	60	58.2
Apr	69	
Aug	67	72.3
May	78	
Jul	78	
Jun	82	

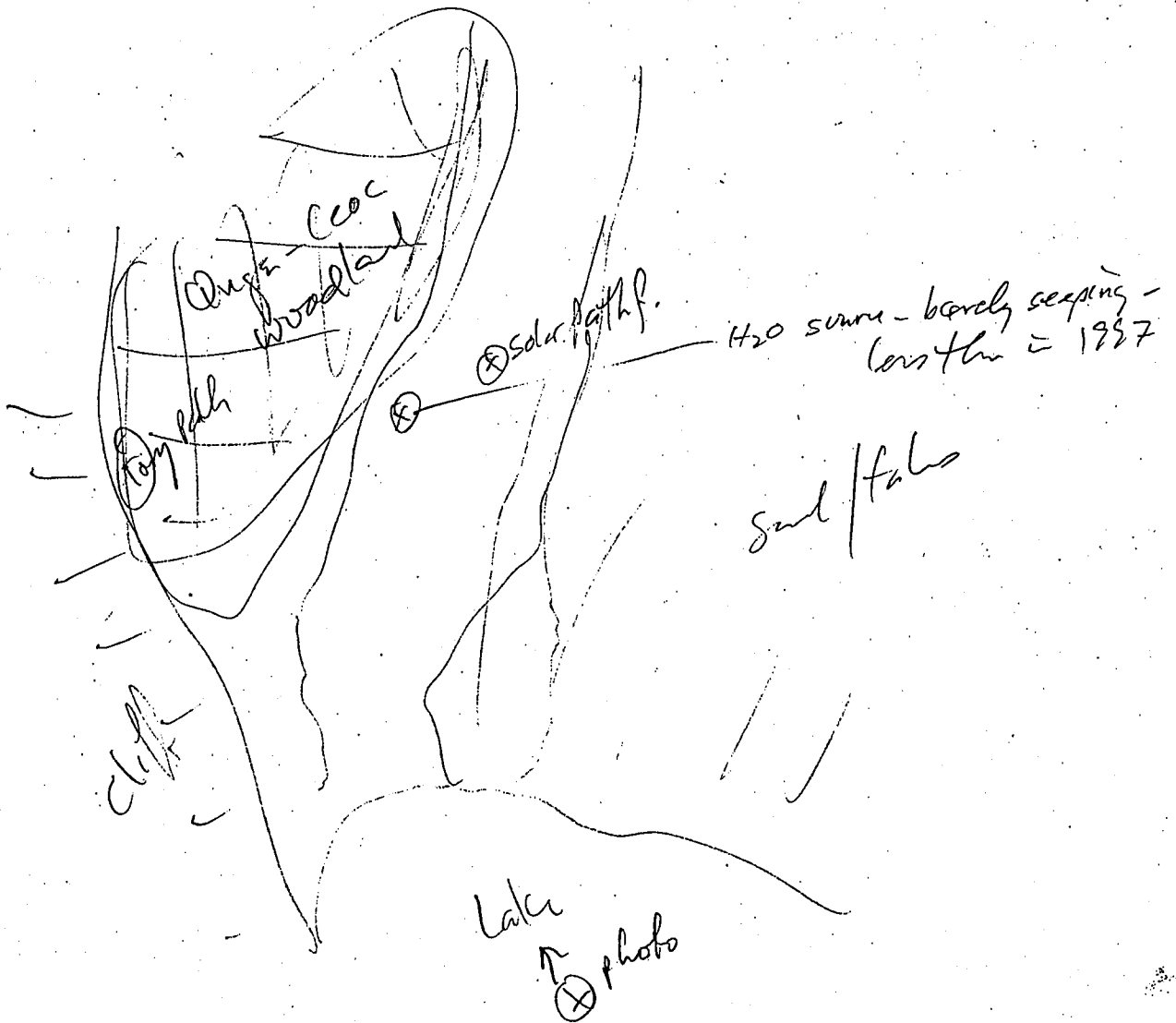


05-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	JS
Location	up from Bwy 14 in short side canyon		
Topo Map	539150E 466830N	UTM	
Transect/Releve No.	GLCA98-06	Date	8/6/98

Sketches below and on back



### HANGING GARDEN DATA SHEET

Investigator <i>JS</i>	Date <i>6/6/92</i>	Releve <i>62CA98-05</i>	Record
Garden location <i>in short side canyon up from Cladium patch at Broy <del>u</del> ufa</i>		Aspect <i>100° mag N</i>	Geology <i>Kangenta</i>
UTM		Size <i>0.1 acre</i>	
Distance from drainage	Structure <i>spring</i>	Elevation <i>3750</i>	Water flow <i>41.0</i>
Exposure <i>2.5</i>			
Disturbance <i>rockfall, flooding</i>			
Species	General	BU <del>100° mag N</del>	DS PP
<i>Drya to 25'</i>		<del>BT</del>	
<i>Ceoc to 15'</i>		<del>BT</del>	
<i>Brlo</i>		<del>BT</del>	
<i>Adca</i>		<del>BT</del> <i>along creek w/ seeps</i>	
<i>Sosp</i>		<del>BT</del>	
<i>Clif</i>		<del>BT</del>	
<i>Baem</i>		<del>BT</del>	
<i>Elca</i>		<del>BT</del>	
<i>Rhtr</i>		<del>BT</del>	
<i>Phle</i>		<del>BT</del>	
<i>Tary</i>		<del>BT</del>	
<i>Phen small pool</i>		<del>BT</del>	
<i>Saey</i>		<del>BT</del>	
<i>Tach</i>		<del>BT</del>	
<i>Faac</i>		<del>BT</del>	<i>stream</i>
<i>Epgj</i>		<del>BT</del>	
<i>Tyco</i>		<del>BT</del>	

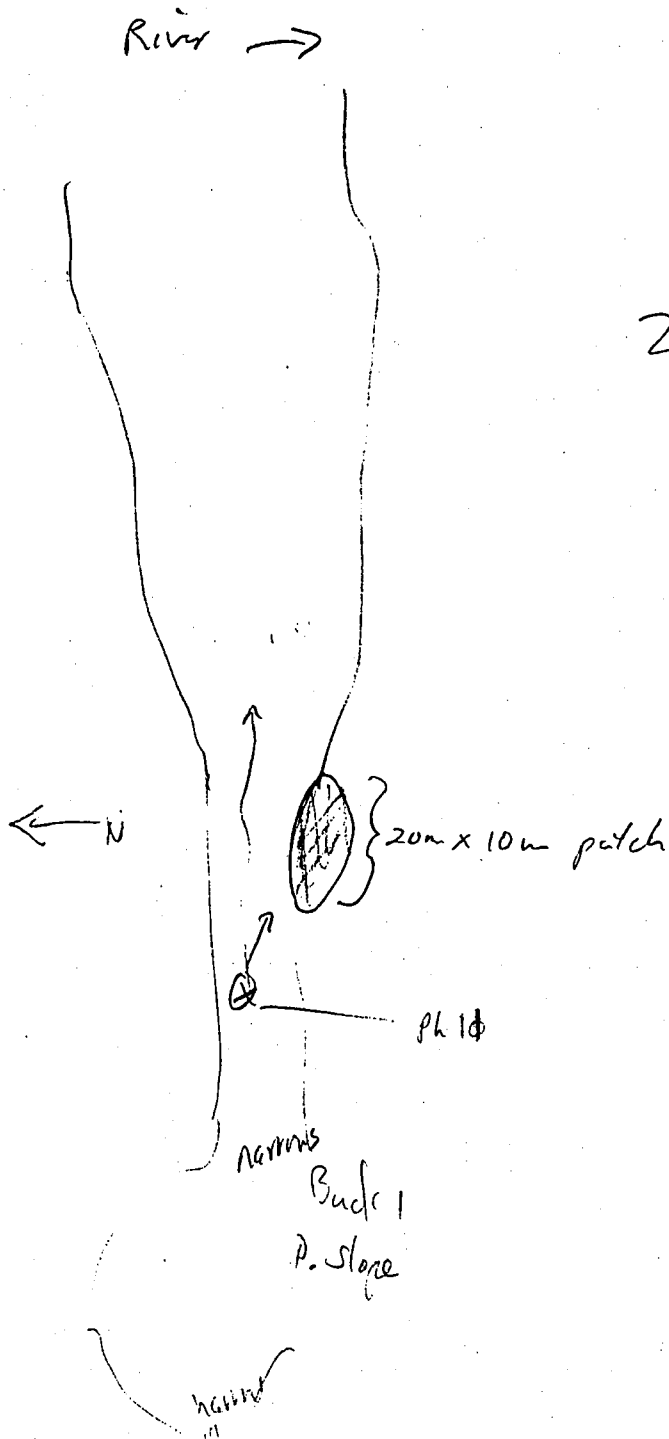
Dec	45	
Jan	53	
Nov	52	
Feb	61	56.5
Oct	62	
Mar	66	
<hr/>		
Sep	66	60.5
Apr	65	
Aug	63	64.5
May	62	
Jul	62	
Jun	69	



GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	JS
Location	Buckhorn Canyon	(backfire)	
Topo Map		UTM	
Transect/Releve No.	Buck 1 (CRI)	Date	5/10/98

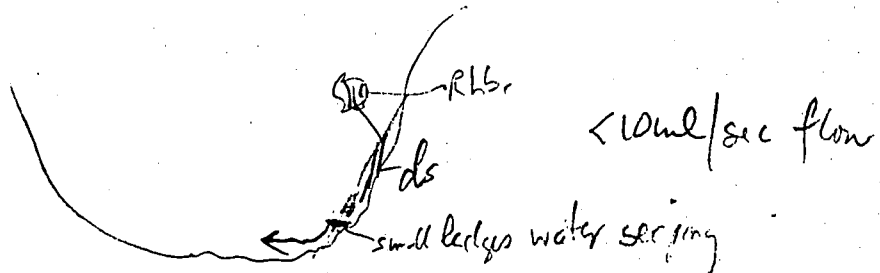
Sketches below and on back





Species	General	BW	DS	PP
Growth form	General	BW	DS	PP
trees				
shrubs			O	
forbs			A	
graminoids			U	
cryptogams lichen moss hepatic			R	
algal mat			R	
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
Comments <i>Lazuli Bunting</i> <i>C. Treefrog</i> <i>Red-sp Trad</i>				

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

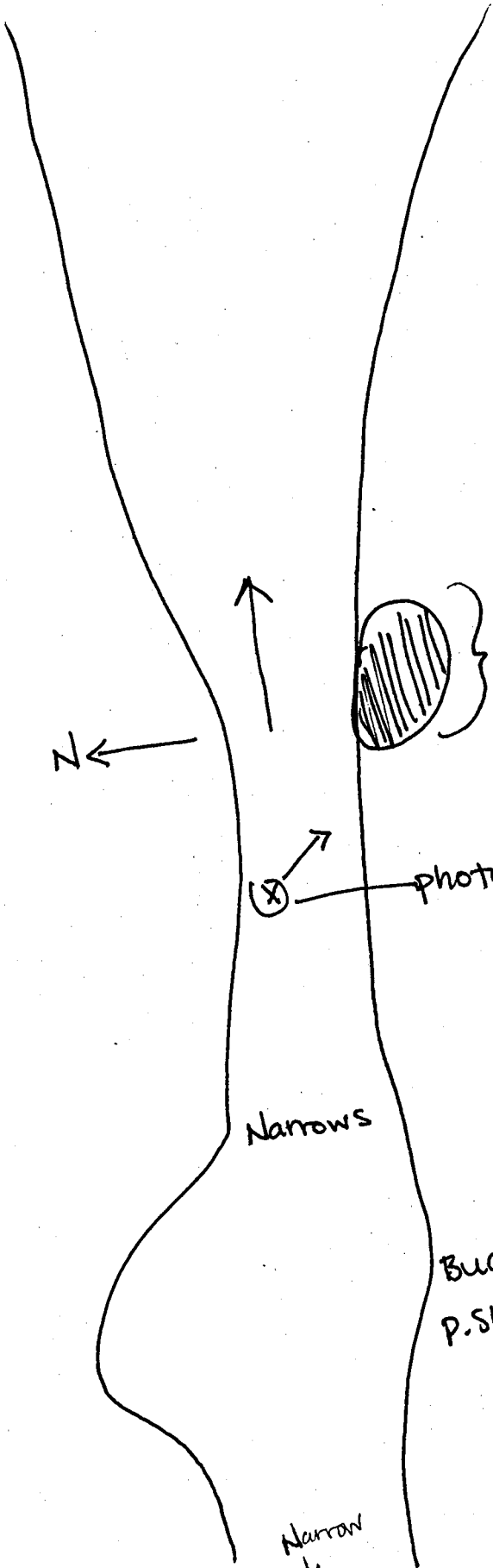


**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <i>GRCA 98-01</i>				Date		Workers			
Site	Temperature	DO	Conductivity	pH					
	<i>14.0</i>	<i>8.9</i>	<i>476</i>	<i>7.50</i>					
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	<i>0</i>
								Feb	<i>0</i>
								Mar	<i>3</i>
								Apr	<i>21</i>
								May	<i>35</i>
								June	<i>37</i>
								Jul	<i>41</i>
								Aug	<i>18</i>
								Sep	<i>9</i>
								Oct	<i>0</i>
								Nov	<i>0</i>
								Dec	<i>0</i>

*Q too low < 10 ml/minute*

RIVER →



20M x 10M patch

photo 11

Narrows

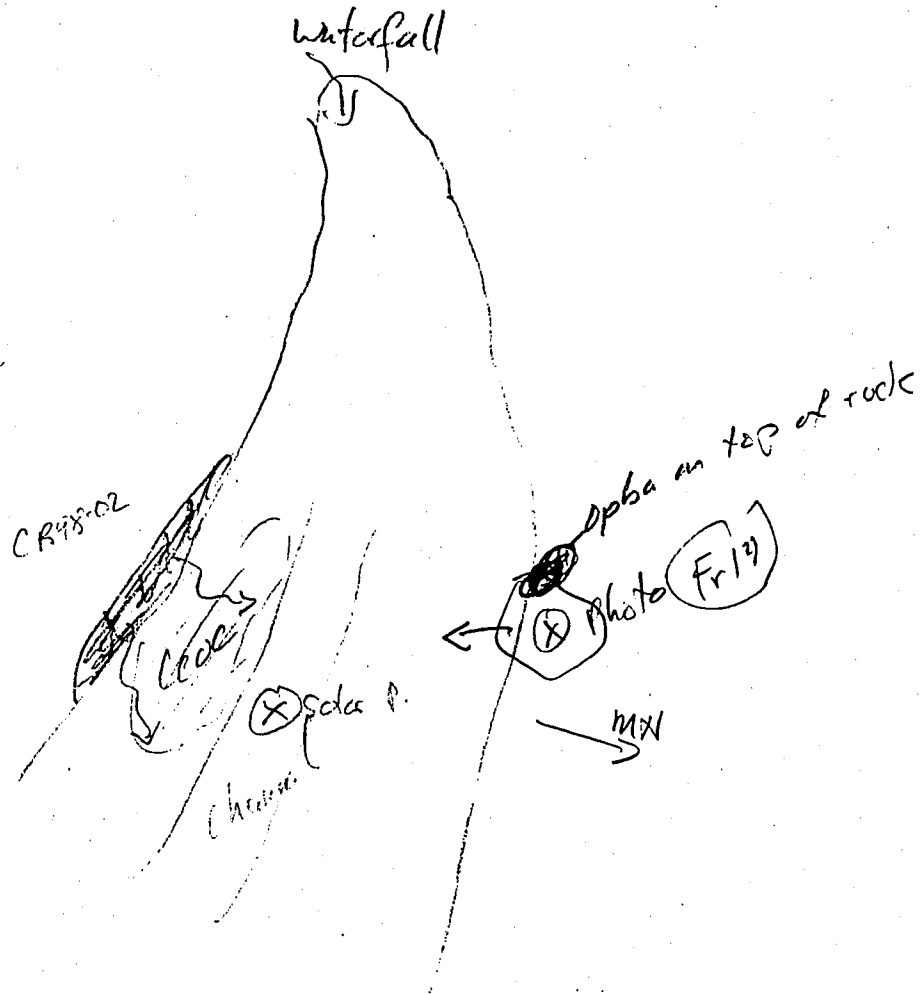
Buck 1  
P. slope

Narrow  
↓

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	JS
Location	Bart Canyon		
Topo Map	UTM		
Transect/Releve No.	CR98-02	Date	5/11/98

Sketches below and on back



30-98

## HANGING GARDEN DATA SHEET

Investigator JS	Date 5/11/98	Releve CR98-02	Record 30-98	
Garden location Best Canyon	Aspect 0°mn	Geology Muav	Size	
UTM				
Distance from drainage ~ 1/4 mile	Structure simple seep wall	Elevation	Water flow 3	
			Exposure 3.5	
Disturbance road full, deer, stamping, limited recreation				
Species	General	BW	DS	PP
Adca		-C	U	
Aq. tritesnuta		-U	0	
Rhbe		-0	-0	
Cirsium sp. A		0	-C	
Carex cf. spicicola		U	-U	
<del>Auto</del> Thwr		-	-0	
* Soas		-	0	
Ceoc		-	C	
Casc		U	0	
Eg x fo		-	0	
math		0	-U	
Apra		-	-0	
peca		0	-	
Brlo		-R	0	
Soop		0	0	
Ptelea fr.		-	R / shrub	
Gr. no calcarata		U	-	
v. Mann		-	U	
Pape		-	0	
Elymus sp.		-	C	
Carex cf. aurea		R	-	
Scsc		-	0	

Species	General	BW	DS	PP
Bryum cf. luteo-olivaceum - older shoots brownish in drier areas H3 E3		0		
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat		0		
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
Comments Canyon tree frog Wood. Toad Both & visiting Ag. tri. Brru seen in drier spots on DS				

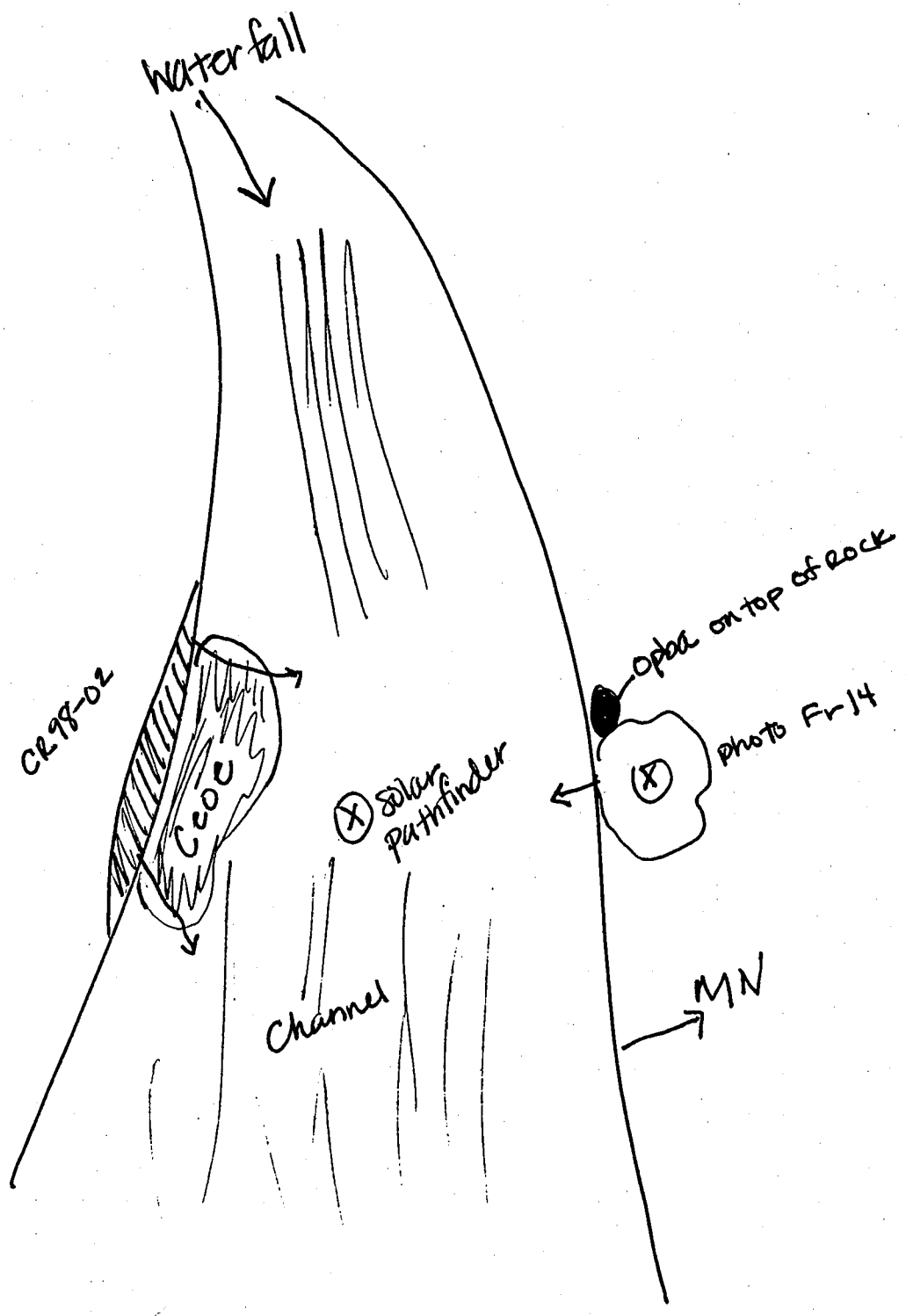
BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)



**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

<b>Site</b>		Bert's C - GRCR-98-02		<b>Date</b>		<b>Workers</b>			
<b>Site</b>	<b>Temperature</b>	<b>DO</b>	<b>Conductivity</b>			<b>pH</b>			
	13.5	9.6	453			7.91			
<b>Water Flow Data (place unit of measurement below Volume)</b>							<b>Solar Pathfinder Data</b>		
<b>Volume</b>	<b>Time</b>	<b>Volume</b>	<b>Time</b>	<b>Volume</b>	<b>Time</b>	<b>Volume</b>	<b>Time</b>	<b>Month</b>	<b>%</b>
								Jan	0
								Feb	0
								Mar	0
								Apr	73
								May	72
								June	72
								Jul	72
								Aug	74
								Sep	7
								Oct	0
								Nov	0
								Dec	0

*Jordan  
Date*

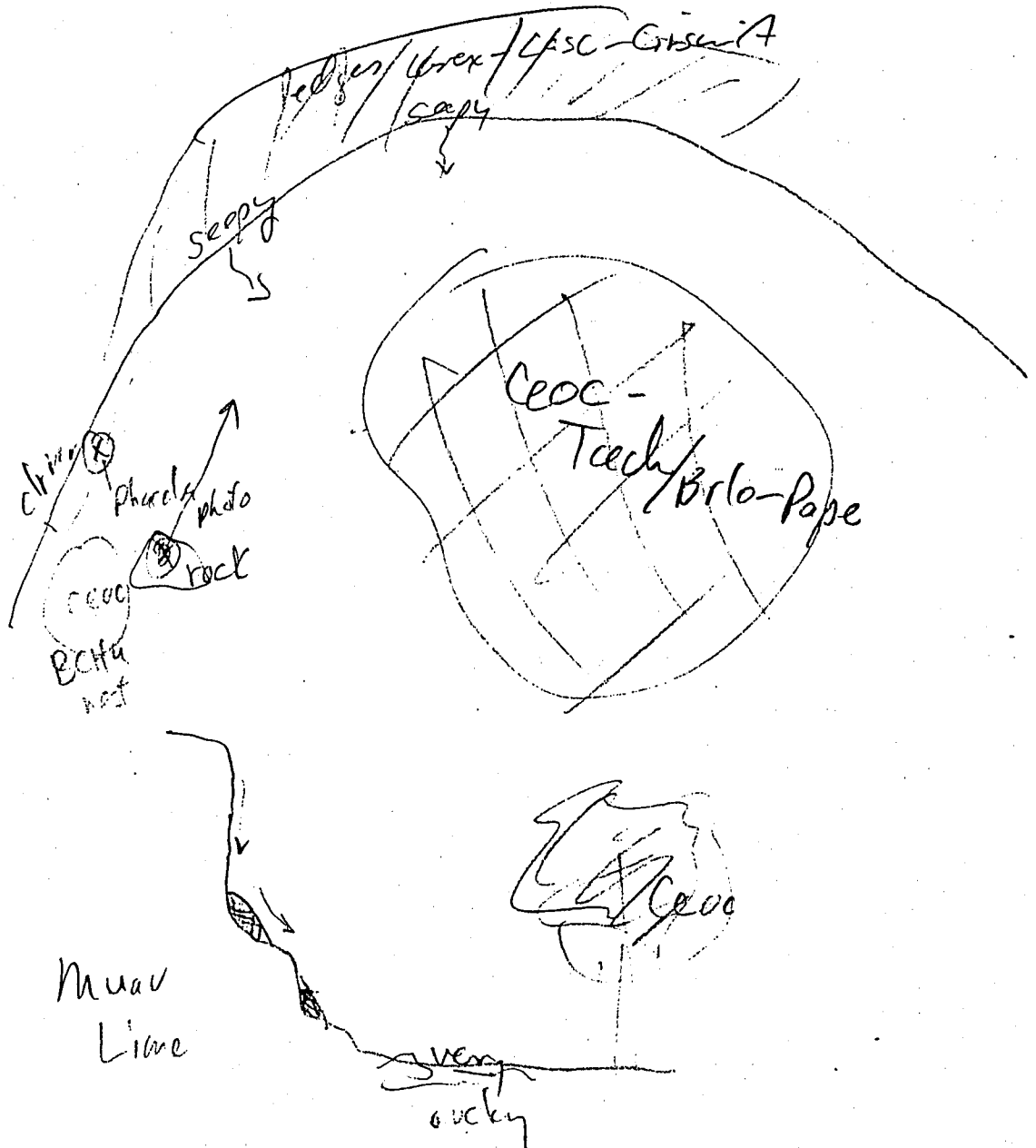


32-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	S8P	Worker	JS
Location	Keyhole Arch		
Topo Map			UTM
Transect/Releve No.	GRCA 98-04	Date	5/11/98

Sketches below and on back



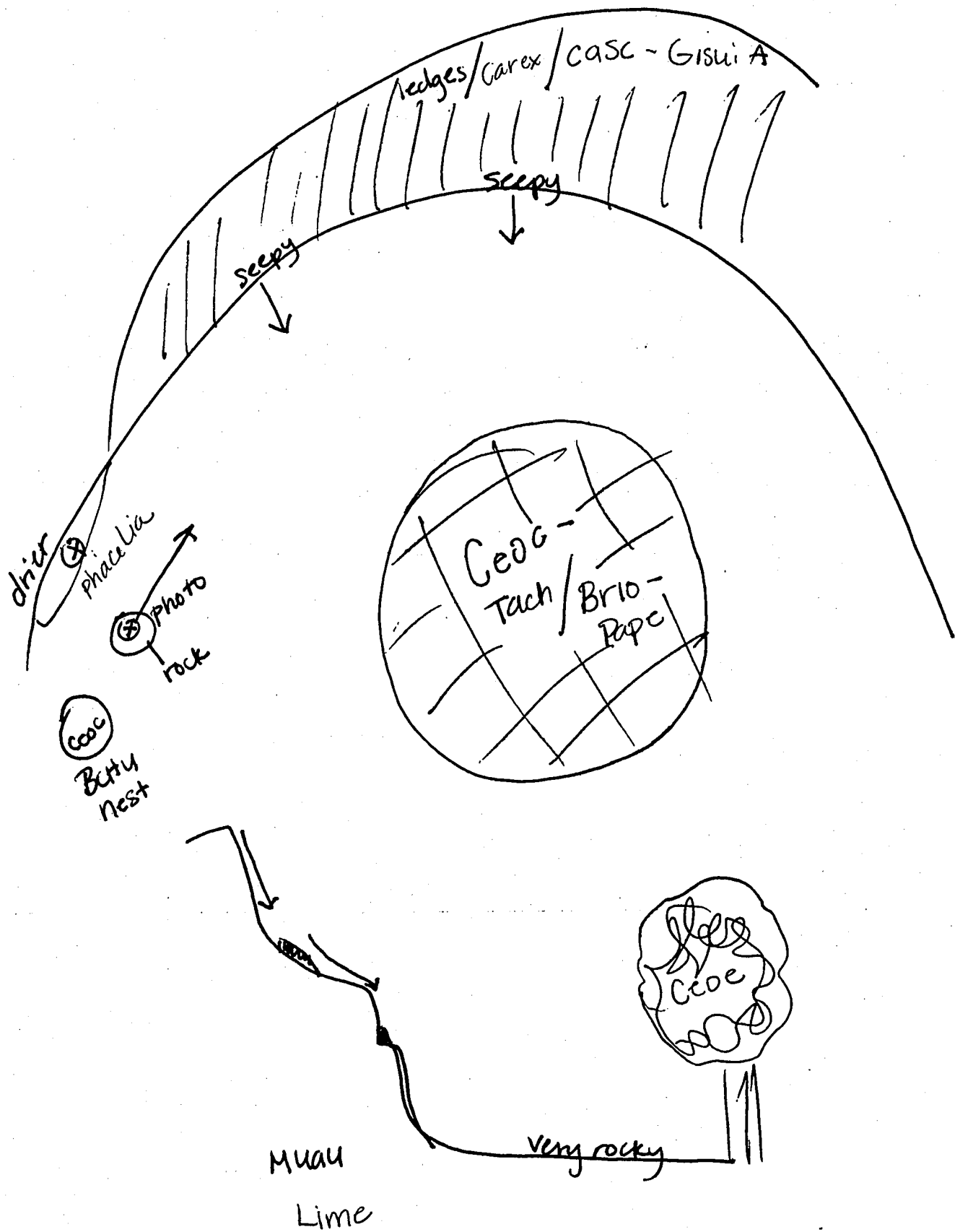


**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

<b>Site</b> <i>Keyhole Spring GRCRA 98-04</i>		<b>Date</b>		<b>Workers</b>
<b>Site</b>	<b>Temperature</b>	<b>DO</b>	<b>Conductivity</b>	<b>pH</b>
	<i>14.0 °</i>	<i>9.3</i>	<i>457</i>	<i>8.5</i>

<b>Water Flow Data (place unit of measurement below Volume)</b>						<b>Solar Pathfinder Data</b>			
---	--	--	--	--	--	------------------------------	--	--	--

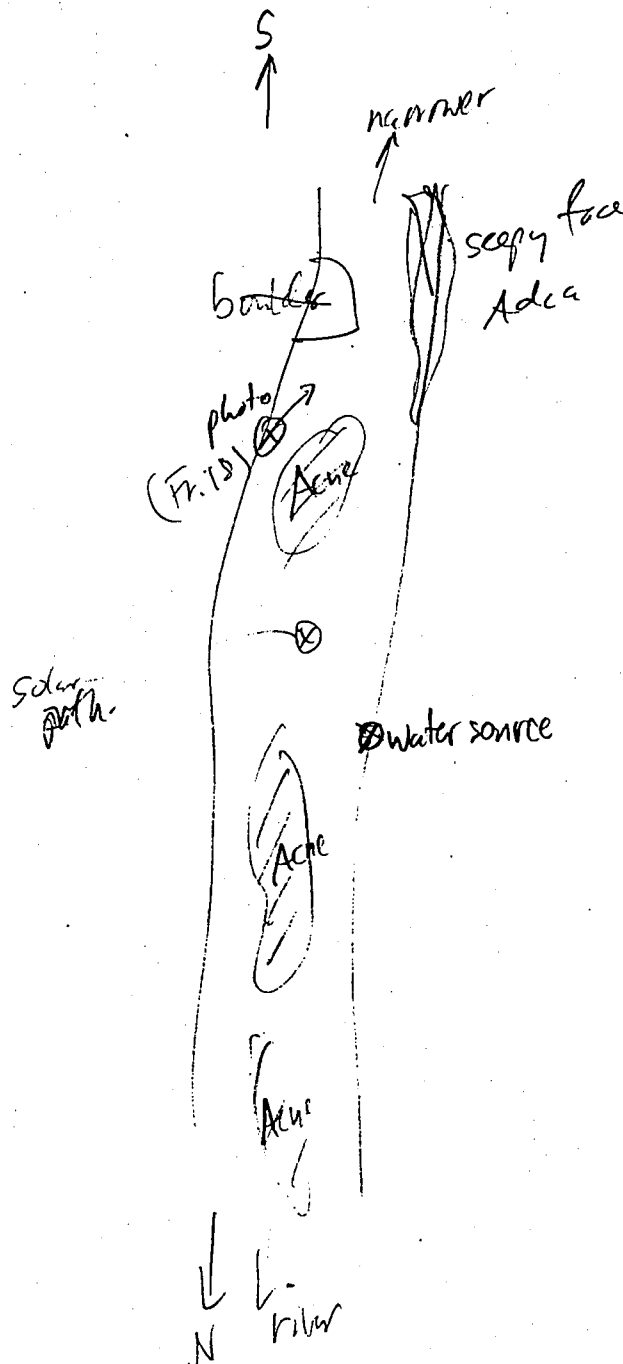
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	<i>0</i>
								Feb	<i>0</i>
								Mar	<i>26</i>
								Apr	<i>36</i>
								May	<i>64</i>
								June	<i>64</i>
								Jul	<i>64</i>
								Aug	<i>42</i>
								Sep	<i>31</i>
								Oct	<i>0</i>
								Nov	<i>0</i>
								Dec	<i>0</i>



**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	GGP	Worker	JS
Location	Saddle Canyon		
Topo Map	UTM		
Transect/Releve No.	BREA 98-03	Date	5/11/98

Sketches below and on back Saddle Canyon 1



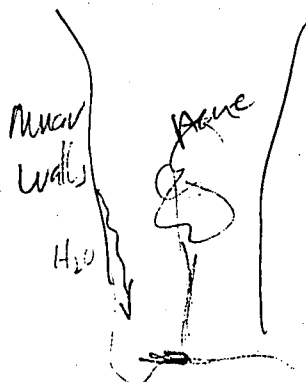
7	Jan	145-200
<del>20</del>	Feb	100-215
27	Mar	1200-145
32	Apr	1115-130
30	May	1045-100
30	June	1020-100
30	Jul	1045-100
24	Aug	1115-100
27	Sep	1200-145
27	Oct	1245-215
6	Nov	145-215
0	Dec	⊗

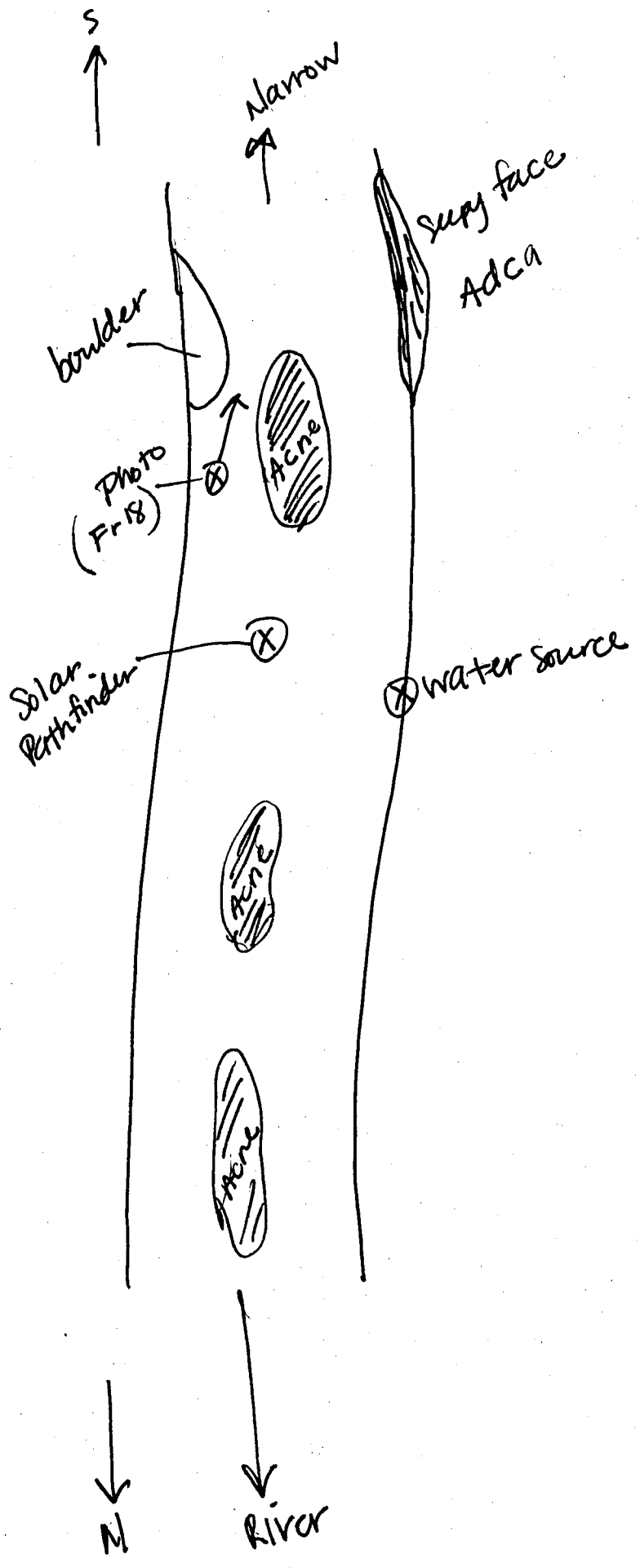




Species	General	BW	DS	PP
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat				
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
Comments Walls mostly dry - patches of <i>Adca</i> , etc				

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)



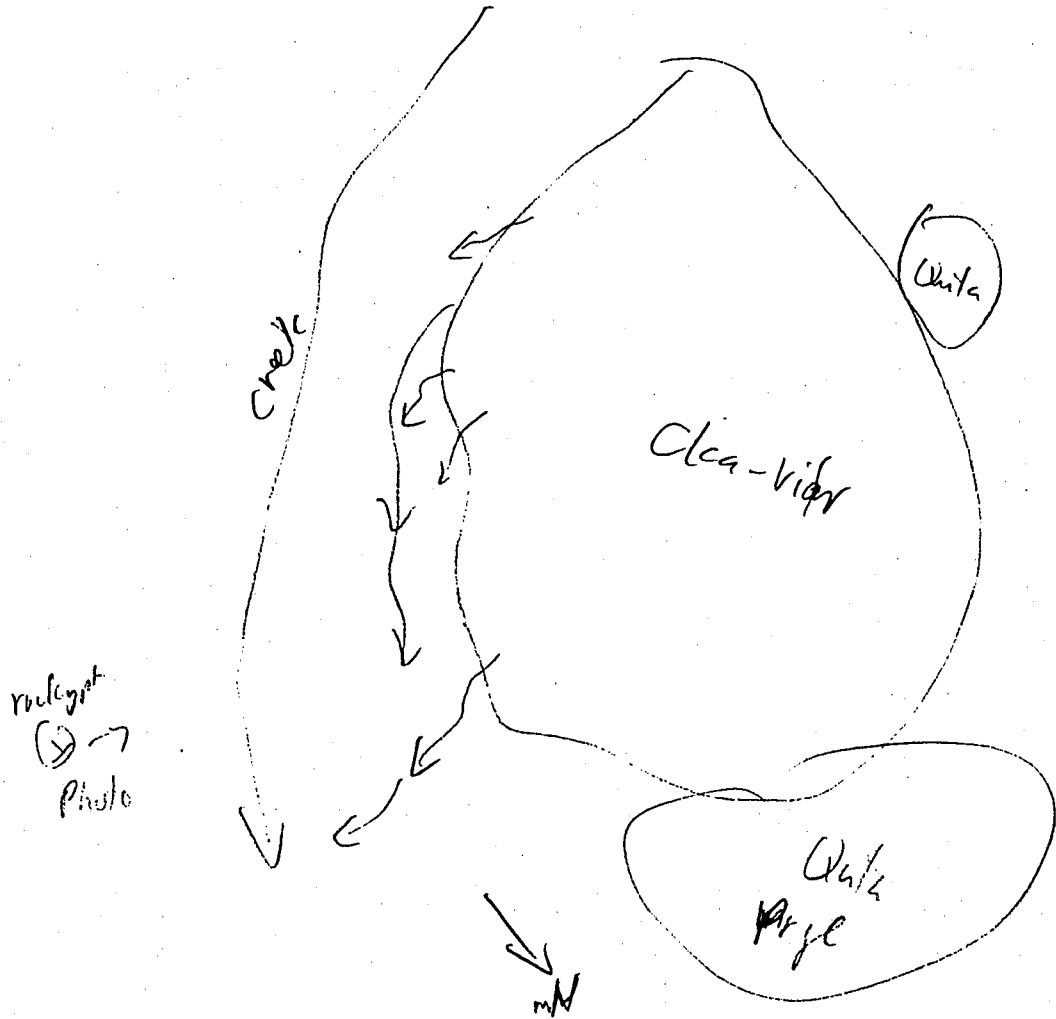


33-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	JS
Location	Naukovec Cr.		
Topo Map		UTM	
Transect/Releve No.	GRC98-05	Date	5/12/98

Sketches below and on back



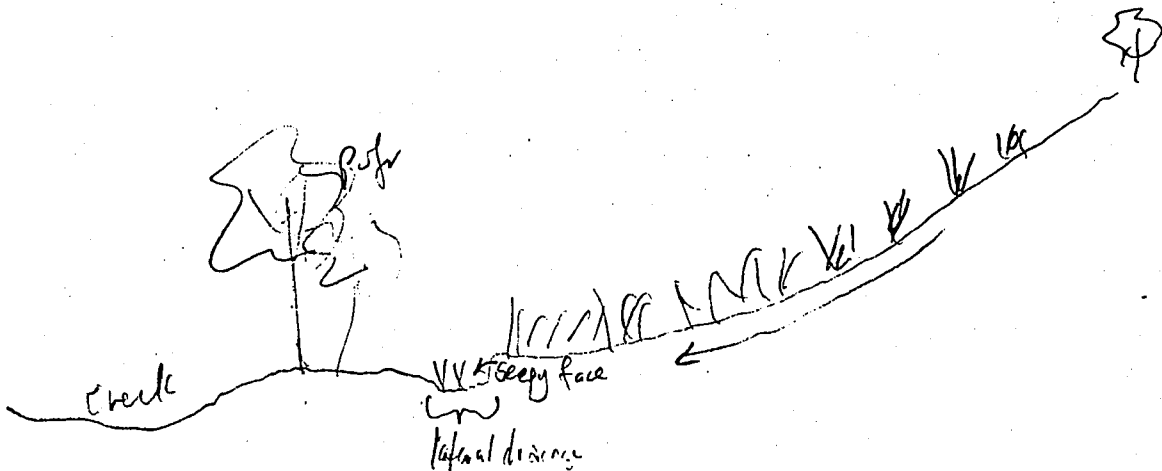
33-98

## HANGING GARDEN DATA SHEET

Investigator JS	Date 5/12/98	Releve GR98-05	Record 33-98	
Garden location up Nankowap ~2.5 mi	Aspect 90° NW	Geology ? complex Pre-camb.	Size large sacve	
UTM				
Distance from drainage	Structure spring	Elevation	Water flow 5.0 heavy	
			Exposure 2	
Disturbance deer, ? people				
Species	General	BW	DS	PP
Clca	A			
Viar	A			
Phau	<del>A</del> U			
Rone	O	scattered		
Oxac	O	mostly margins		
Adca	O	seepy face		
Eprj	R	seepy face		
Elpa	U	along bottom		
Muth	O	seepy face		
Muas	U	along bottom drainage		
Apcu	<del>O</del>			
* Agst	O			
* Tach	R	along bottom - drainage		
Basa	R	"	"	"
Baan	O	"	"	"
Potr	O	"	"	"
Qntu / Prcl	W/C	around patch		
Saex	R	along bottom drainage		
WSP	O	below patch		
Caqr	O	along bottom drainage		
Egar	R	"	"	"
Enfe	O	"	"	"

Species	General	BW	DS	PP
Tydo	R			
Inbr	O			
Growth form	General	BW	DS	PP
trees	—			
shrubs	4%			
forbs	—			
graminoids	100%			
cryptogams lichen moss hepatic	—			
algal mat	—			
Physical	General	BW	DS	PP
Litter	C			
Soil	—			
Rock	—			
<p>Comments</p> <p>dem clca surrounded by vic of Phan</p>				

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)



**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

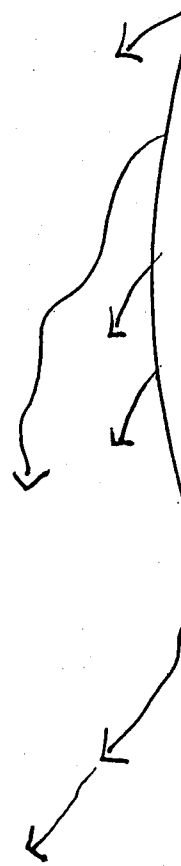
Site		Nankoreap Twin Sp. (lower) 6RCA98-05		Date		Workers			
Site	Temperature	DO	Conductivity	pH					
	17	8.9	705	8.9-8.3					
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	87
								Feb	79
								Mar	92
								Apr	88
								May	85
								June	85
								Jul	85
								Aug	85
								Sep	91
								Oct	89
								Nov	90
								Dec	91

519  
528

$Q = 6345 \text{ ml/sec}$

Rocky Point  
⊗  
Photo

Creek



N

Clca-Viar

Quita

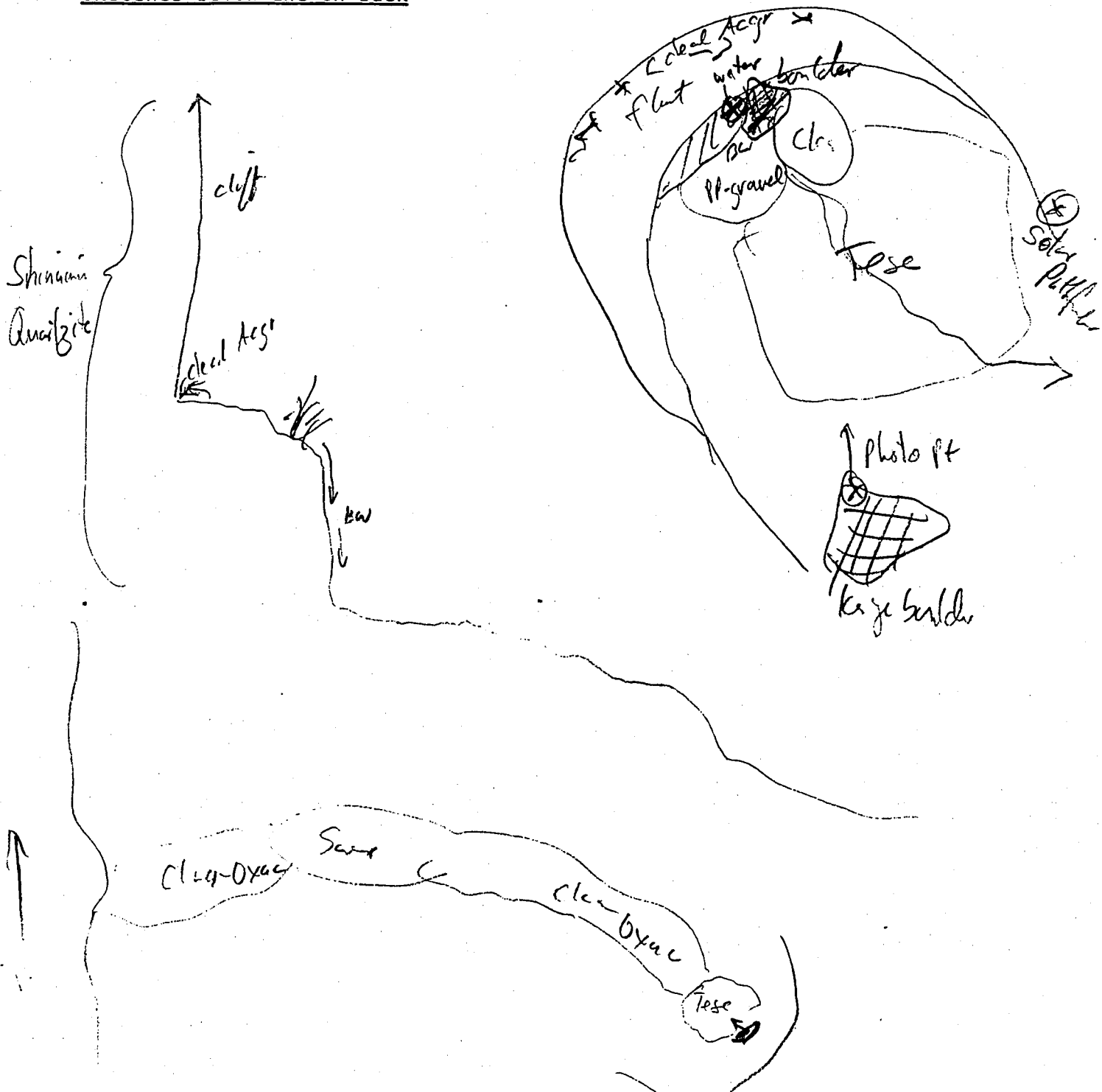
Quita  
Prage

34-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSA	Worker	JS
Location	<del>SSA</del> GRCA 98-06	Hance Spring	
Topo Map		UTM	
Transect/Releve No.	GRCA 98-06	Date	5/13/98

Sketches below and on back





shinano  
marzite

Cliff

dead acgr

Dead Acgr x  
flat water  
water

BW boulder

PP-gravel  
Clca

TESE

Solar Pathfinder

BW

Photo pt

large boulder

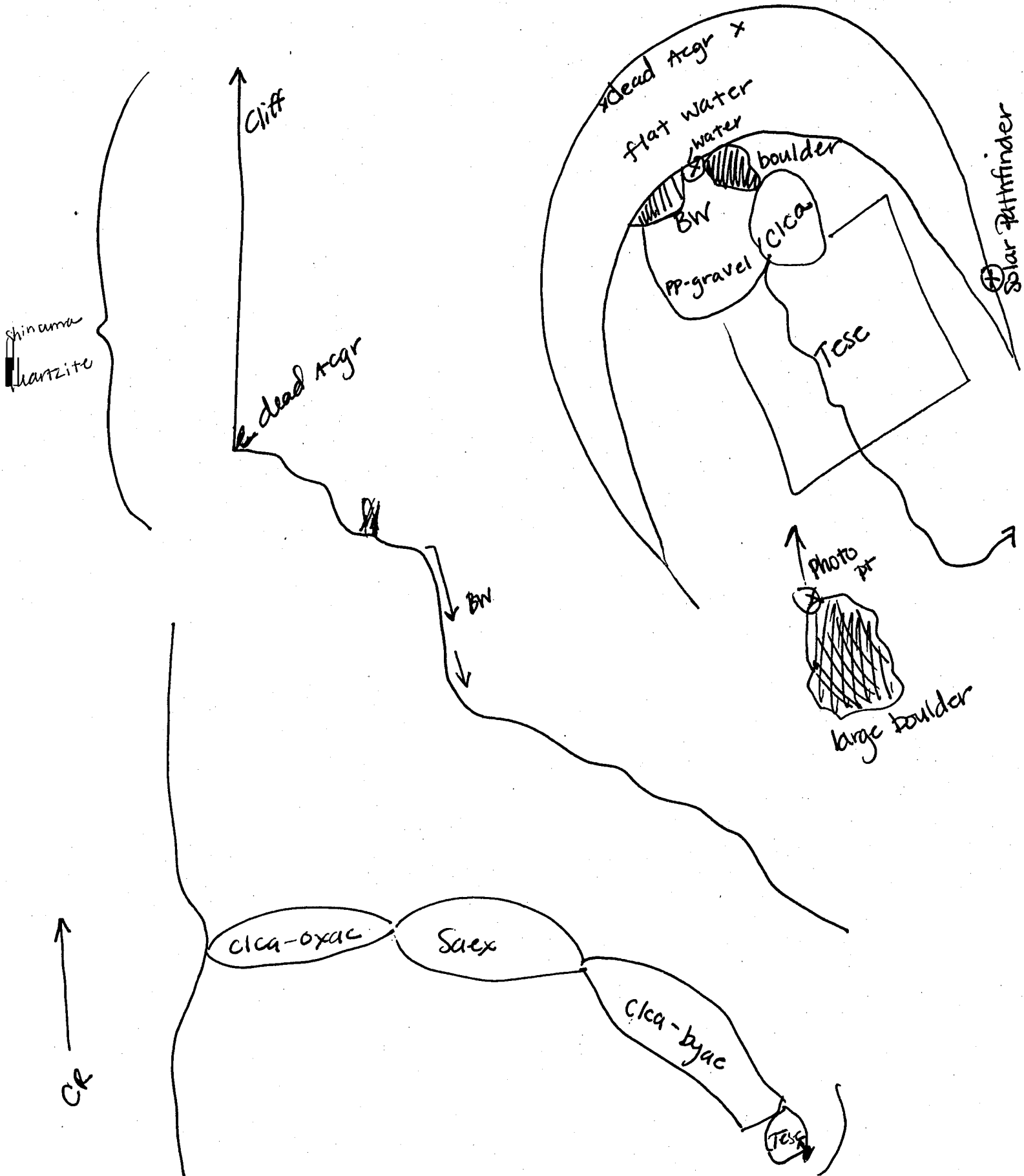
Clca-oxac

Suex

Clca-byac

TESE

CR





Species	General	BW	DS	PP
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic		—		
algal mat		—		
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
<p>Comments</p> <p>Clea A/D below PArea and down to river except for large patch of Saxe in middle</p> <p>birds: Labu, Coye, Luwa, Hoji, BATAU Canyon Treefrog + Bufo tadpoles</p>				

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <i>below Hance GREA98-06</i>				Date		Workers			
Site	Temperature	DO	Conductivity	pH					
	<i>18.8</i>	<i>8.3</i>	<i>911</i>	<i>8.32</i>					
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	<i>87</i>
								Feb	<i>79</i>
								Mar	<i>91</i>
								Apr	<i>62</i>
								May	<i>55</i>
								June	<i>55</i>
								Jul	<i>55</i>
								Aug	<i>60</i>
								Sep	<i>68</i>
								Oct	<i>79</i>
								Nov	<i>82</i>
								Dec	<i>88</i>

$Q = 90.5 \text{ ml/sec}$

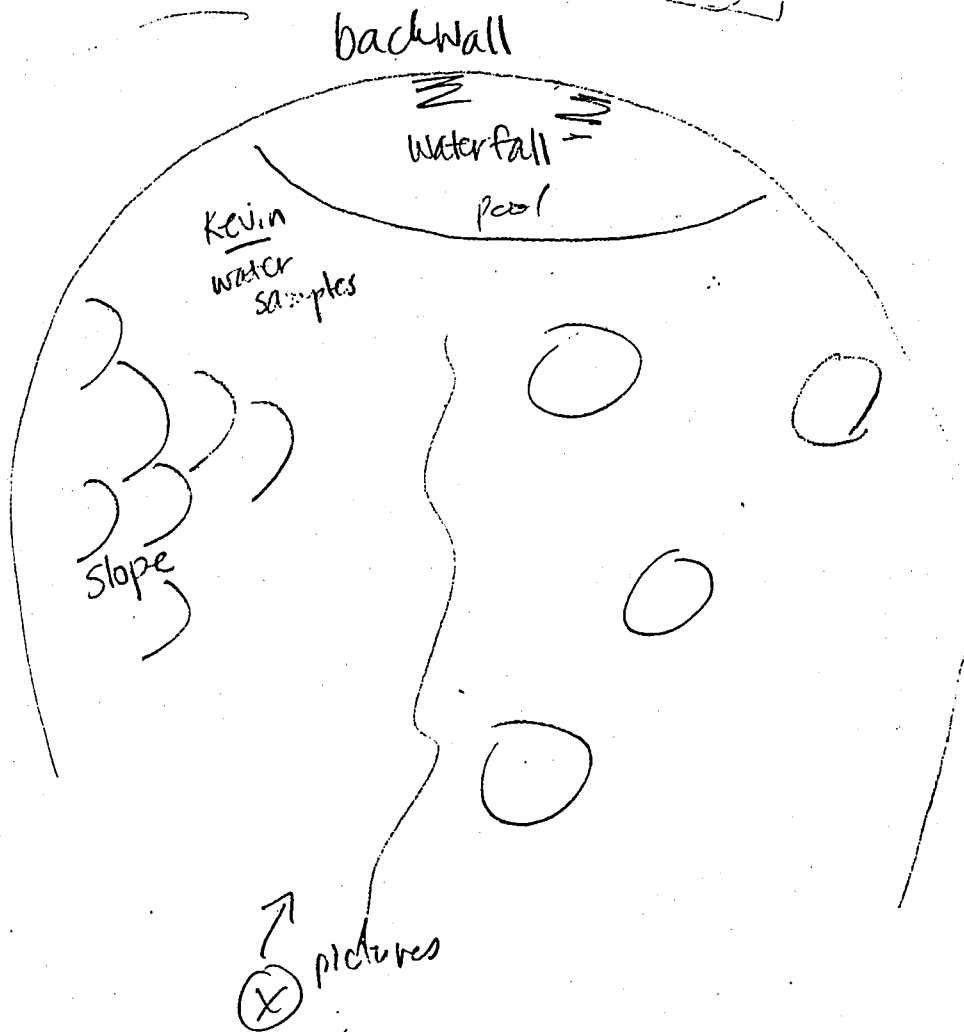
506 W

35-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	JS/SR
Location	Under Elms - of back wall		
Topo Map		UTM	
Transect/Releve No.	62098-07	Date	5/15/98

Sketches below and on back



35-98

## HANGING GARDEN DATA SHEET

Investigator	JS/SR	Date	5/15/98	Releve	GRSA-98-07	Record	35-98
Garden location	Upper end of Elvas C. as large BW	Aspect	0° mm	Geology	Muav- Trachti	Size	large > 1 acre
UTM							
Distance from drainage	1/3 mile	Structure	alcove BW/pp	Elevation		Water flow	4.5
						Exposure	4.0
Disturbance	rockfall, flooding, recreation						
Species	General	BW	DS	PP			
Adca	O	U	U				
Mica		O	A				
Mi. d. gla			O				
* Aase			O				
Agch		U	U				
Sosp			O				
* Soas			R				
* Brte			O				
Clea	C						
Pare	U						
Arly	R						
Basg			O				
Rhke	O		O				
Brlo		R	O				
Leoc	C		O				
Core	<del>U</del>						
dryland Fran 1 shrub			R				
Pthr	R		R				
Peca		U	—				
Epgi		R	O				
dryland Draba spp	X		R				
Gast			R				

Species	General	BW	DS	PP
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat	<del>U</del>	C		
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
Comments  LPH BCAU				

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

<b>Site</b> Elves C. GYCA 98-07	<b>Date</b>	<b>Workers</b>
---------------------------------	-------------	----------------

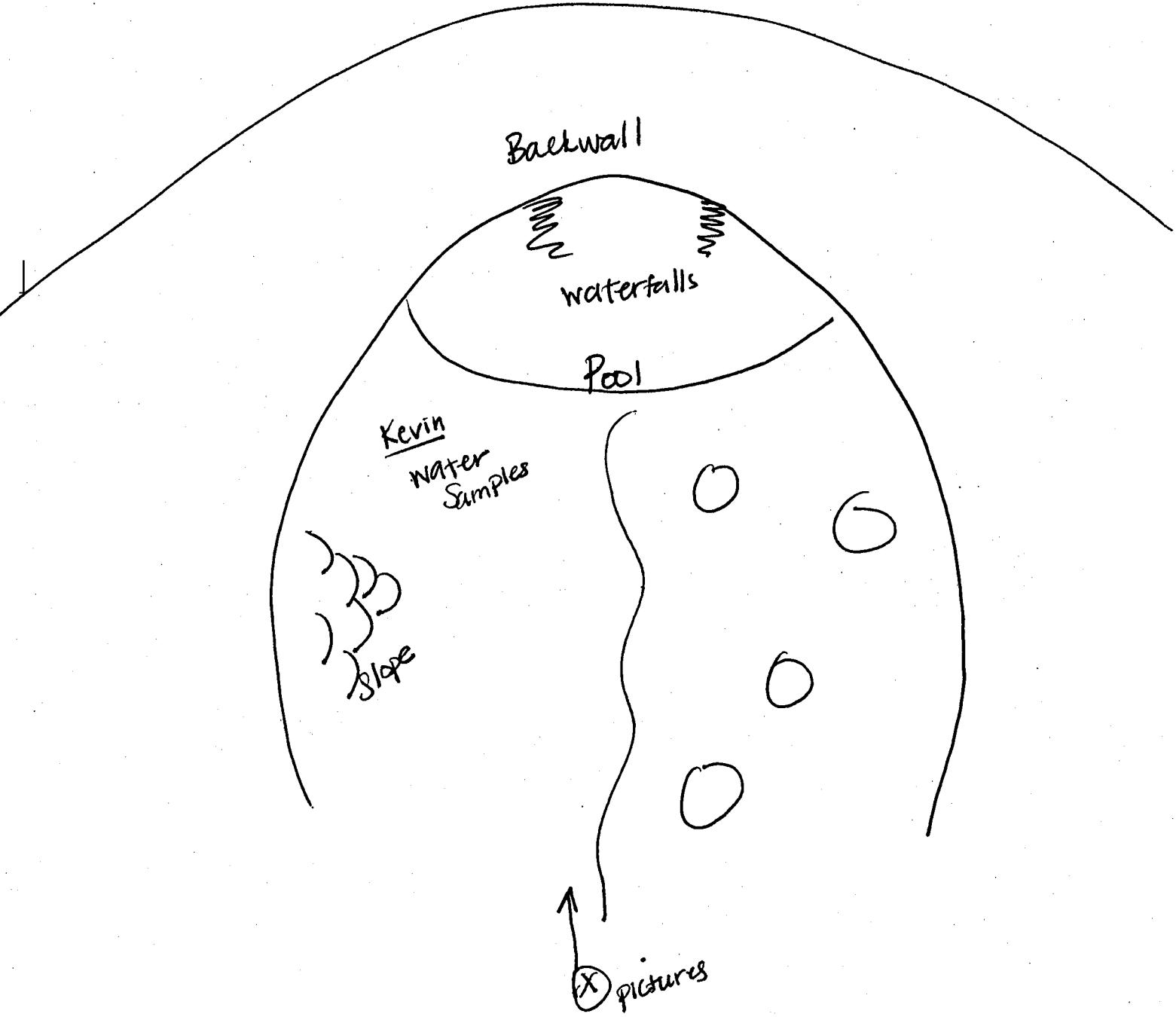
Site	Temperature	DO	Conductivity	pH
	9.0 !	10.4	612	8.43

Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
--	--	--	--	--	--	--	-----------------------	--	--

Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	0
								Feb	0
								Mar	0
								Apr	12
								May	24
								June	24
								Jul	24
								Aug	18
								Sep	0
								Oct	0
								Nov	0
								Dec	0

$Q = 681 \text{ ml/sec}$



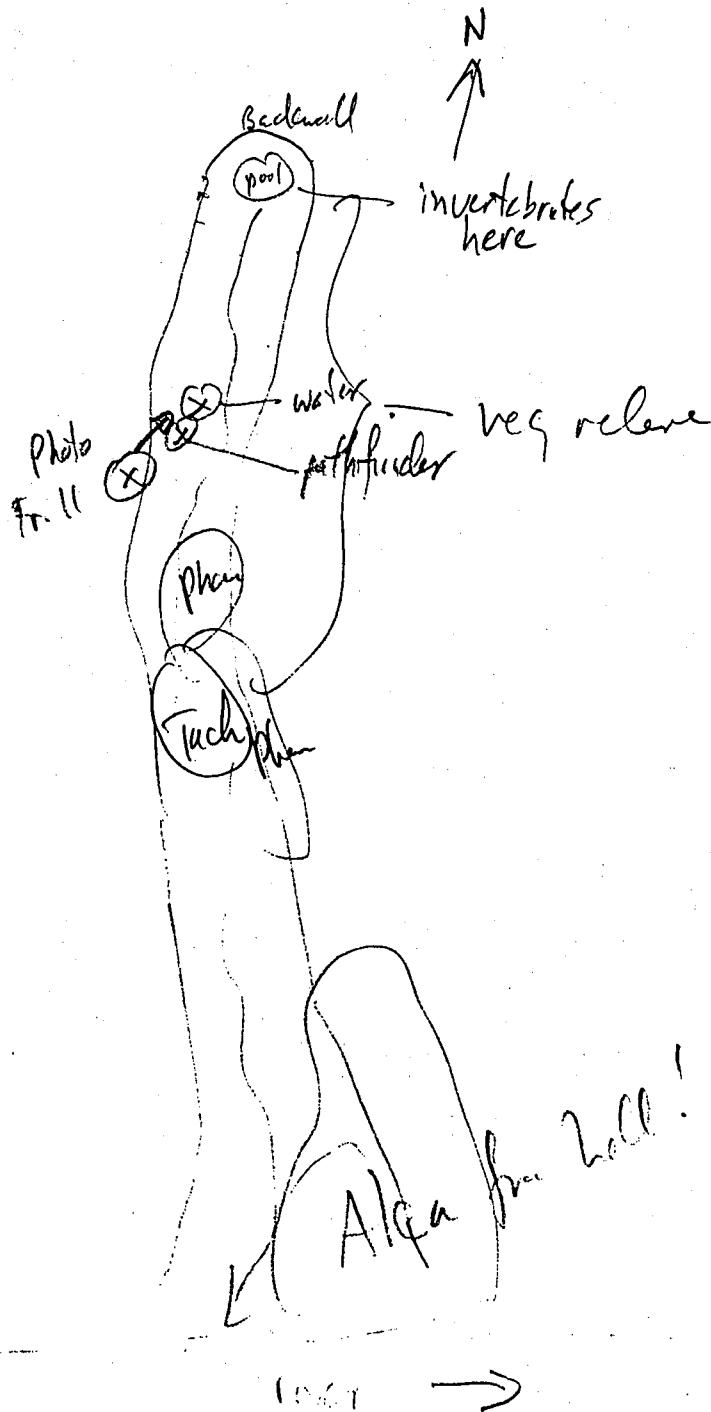


36-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	Worker	OS
Location	125.5 RM Spring	
Topo Map	UTM	
Transect/Releve No. 6RCA98-08	Date	5/15/98

Sketches below and on back





Species	General	BW	DS	PP
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat				
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
<p>Comments</p> <p>rockfall, soil slumps, probably no real flooding - people in lower 1/2</p> <p>Red-sp. Toad, Canyon Treefrog Tebu, Luwa, Bchu, Coye, Hofi, Cawr</p>				

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

<b>Site</b> 125.52 Spring GRCA 98-08			<b>Date</b> 5/15/98		<b>Workers</b> JS				
<b>Site</b>	<b>Temperature</b>	<b>DO</b>	<b>Conductivity</b>		<b>pH</b>				
	19.0	—	1647*		8.39				
<b>Water Flow Data (place unit of measurement below Volume)</b>						<b>Solar Pathfinder Data</b>			
<b>Volume</b>	<b>Time</b>	<b>Volume</b>	<b>Time</b>	<b>Volume</b>	<b>Time</b>	<b>Volume</b>	<b>Time</b>	<b>Month</b>	<b>%</b>
								Jan 76	8:45-1:45
								Feb 76	8:45-2:15
								Mar 75	8:00-2:15
								Apr 75	7:45-2:52
								May 73	7:45-2:42
								June 71	7:45-2:30
								Jul 71	7:45-2:30
								Aug 73	7:45-2:30
								Sep 76	7:45-2:15
								Oct 78	8:15-2:15
								Nov 77	8:45-2:00
								Dec 74	9:00-1:45

est. 1 liter/minute

456 W  
439 S

\*- Due maybe to contact with Bright Angel Shale?

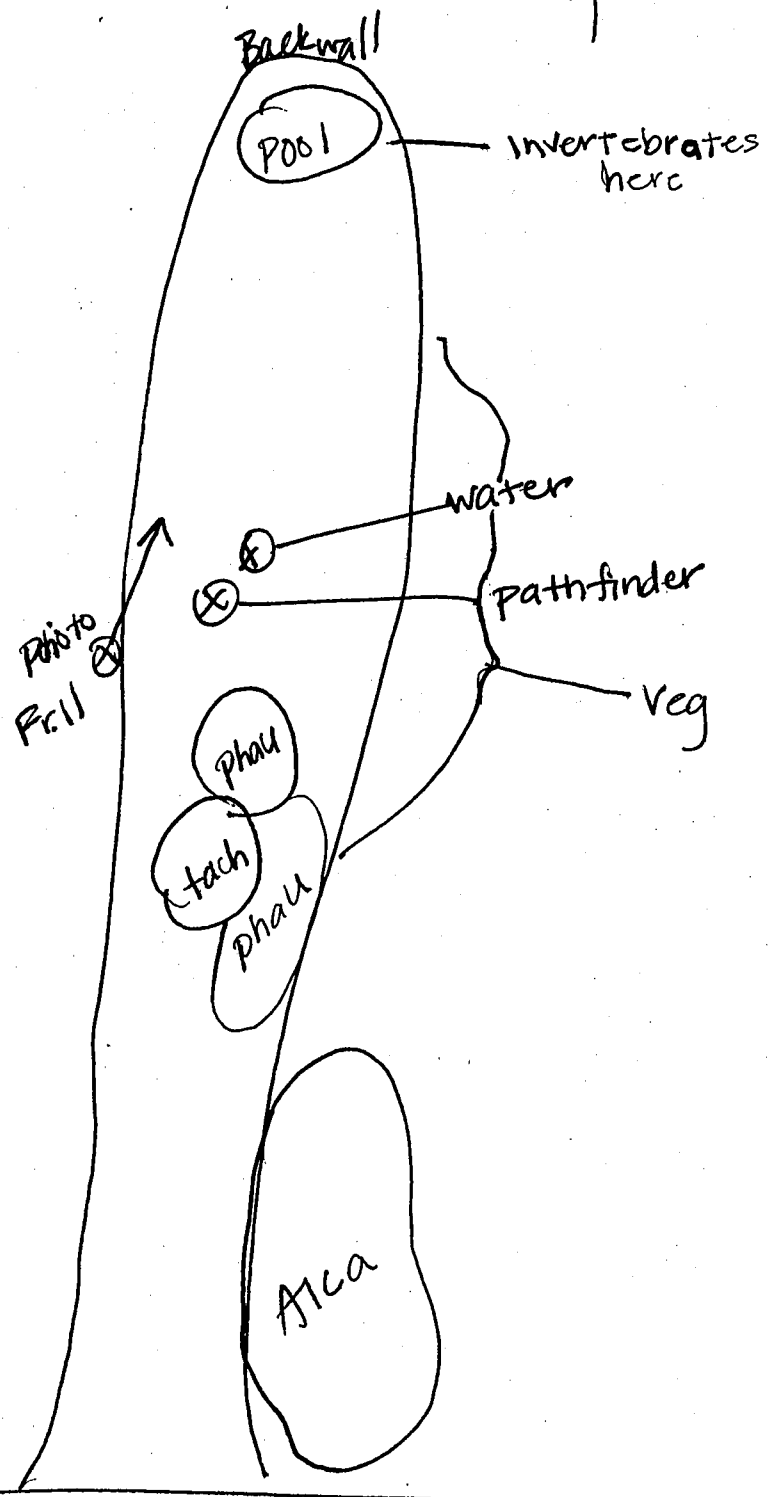


Photo Pt. 11

Backwall

Pool

Invertebrates here

water

Pathfinder

veg

phau

tach

phau

Alca

RIVER →

37-98

HANGING GARDEN DATA SHEET

Investigator JS	Date 5/16/98	Releve 6RFA98-09	Record 37-98
Garden location Lower Deer Cr Spring	Aspect 170mm	Geology	Size large D/hoc
Distance from drainage ~ 100' or less	Structure spring	Elevation	Water flow 4.5" T=64°F
Disturbance very little except along lower <sup>=17.8°C</sup> edge by river - some possible rockfall/clipping people tend to stay out because of Tury			
Species	General spring	BW	DS
Tury	u		
Sarc	C		
Basa	u		
Ba. of Sar.	o		
Paen	o		
Tose	R		
Rob-neo	u		
* Agst	o		
Abca	o		
Mica	o		
Tydo	o		
Phan	u		
<del>Basa</del>	—		
Egfe	o		
Thwr	o		
* Tach	R		
* Naof	o		

GLEN CANYON NATIONAL RECREATION AREA  
 WATER AND SOLAR RADIATION DATA

GCA 98-04

Site		Date		Workers					
L. Deer Creek Spring									
Site	Temperature	DO	Conductivity	pH					
		Kevin had his little "accident".							
Hand-held	17.8°								
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	51
								Feb	89
								Mar	91
								Apr	96
								May	95
								June	95
								Jul	92
								Aug	89
								Sep	94
								Oct	89
								Nov	56
								Dec	36

472  
 561

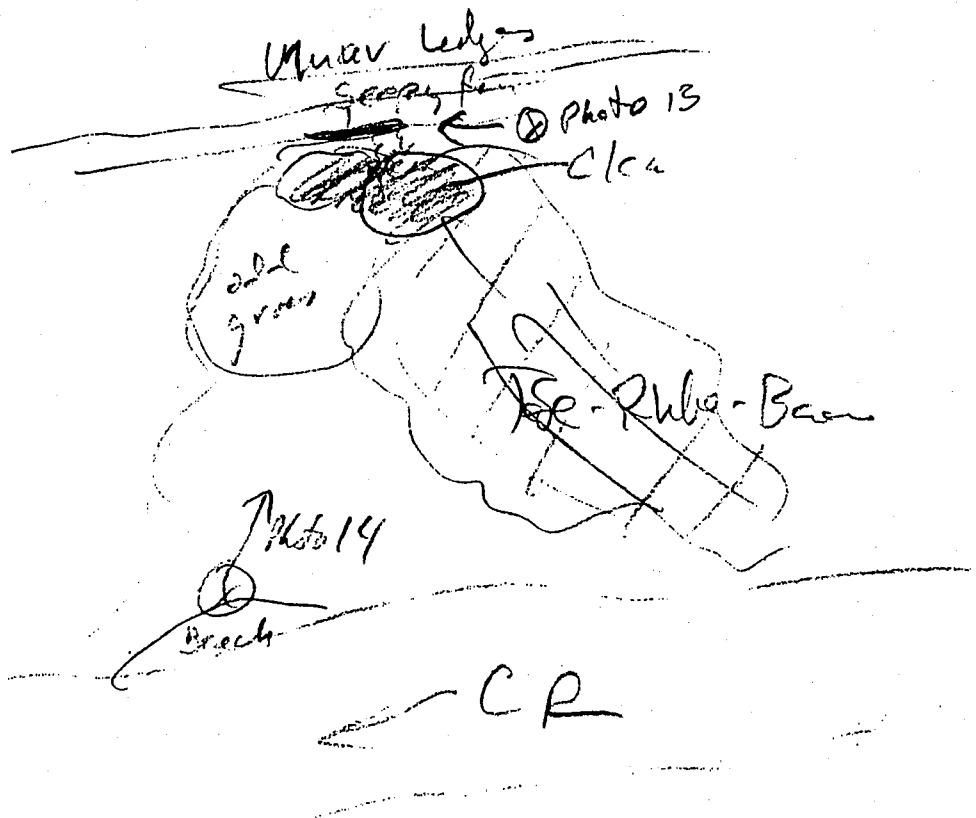


38-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	Worker
Location 142R	
Topo Map	UTM
Transect/Releve No.	Date

Sketches below and on back



38-98

HANGING GARDEN DATA SHEET

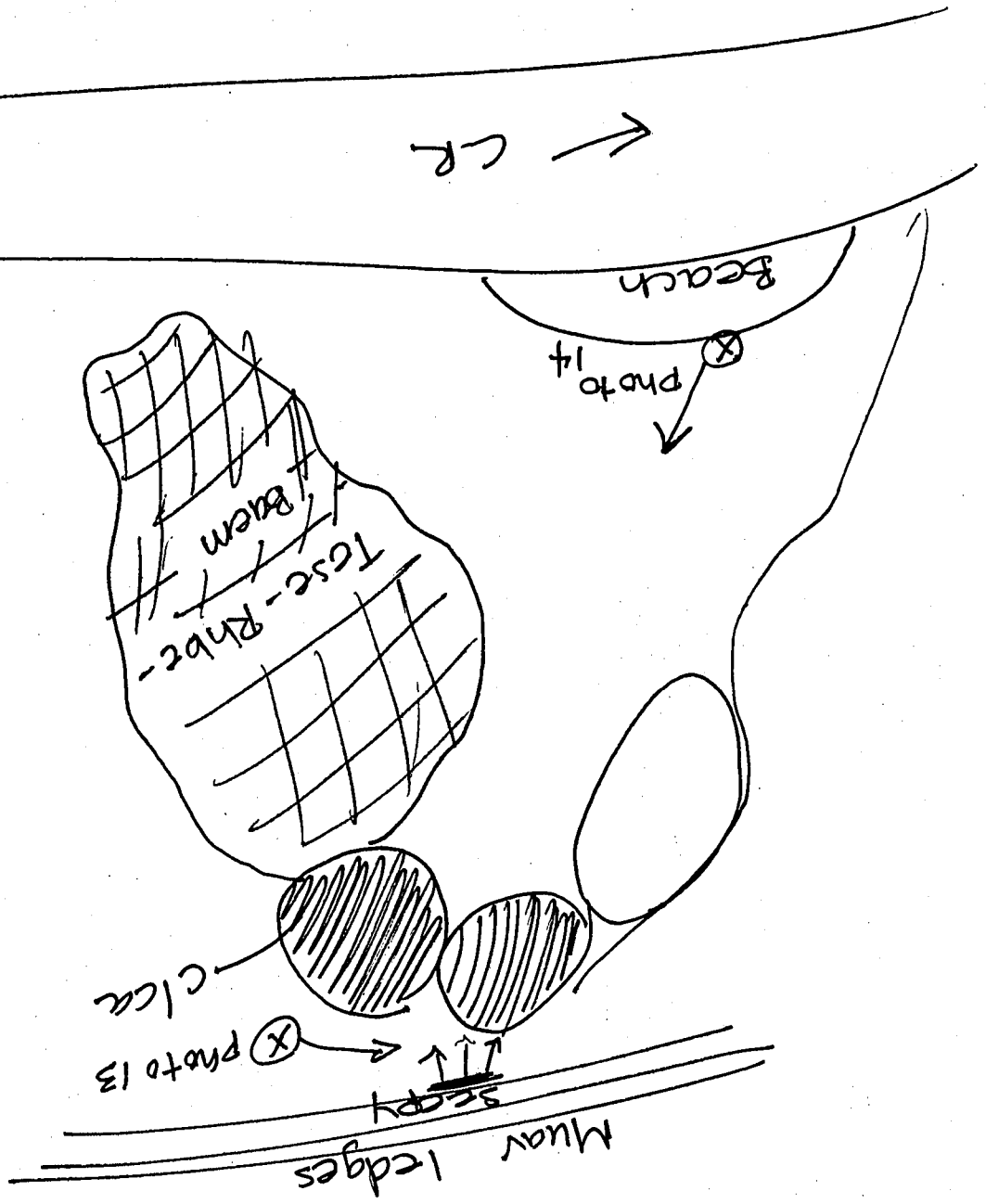
Investigator JS		Date 5/15/98		Releve GRA98-15	Record 38-98
Garden location 1/2 R. above Kumb Cr.			Aspect 170° m n	Geology base of MUGUL.	Size small Area ≈ 2m <sup>2</sup> otherwise a
Distance from drainage ~ 200'		Structure Seeping water/ps	Elevation 580	Water flow 1.0	Exposure 2.5
Disturbance soil slumping					
Species	General	BW	DS	PP	
lase		-	A		
Rhiz		-	O		
Brem		-	O		
Clca		R	U		
Trox		-	U		
Adk		U	R		
Enci		O	-		
* Turb		-	O		
<del>Enci</del>					
Plant (cor. mal. co)		C	O		
Panicum / <del>Plant</del>	(coll.)	O	-		
Scsc		O	O		
Sosp		O	O		
Dist. - like - <sup>til. rigida</sup> grass		-	O		
Thwr		-	O		
ASSO		-	R		
odd "Buck-like" - like grass (coll.) (same as saddle flowers)		R	-		

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

<b>Site</b> 142R		GRCA 98-10		<b>Date</b>		<b>Workers</b>				
<b>Site</b>	<b>Temperature</b>	<b>DO</b>	<b>Conductivity</b>		<b>pH</b>					
	—	—	—		—					
<b>Water Flow Data (place unit of measurement below Volume)</b>							<b>Solar Pathfinder Data</b>			
<b>Volume</b>	<b>Time</b>	<b>Volume</b>	<b>Time</b>	<b>Volume</b>	<b>Time</b>	<b>Volume</b>	<b>Time</b>	<b>Month</b>	<b>%</b>	
								Jan	0	
								Feb	21	
								Mar	98	
								Apr	92	
								May	88	
								June	88	
								Jul	88	
								Aug	90	
								Sep	98	
								Oct	46	
								Nov	0	
								Dec	0	

Q not done

165+  
544

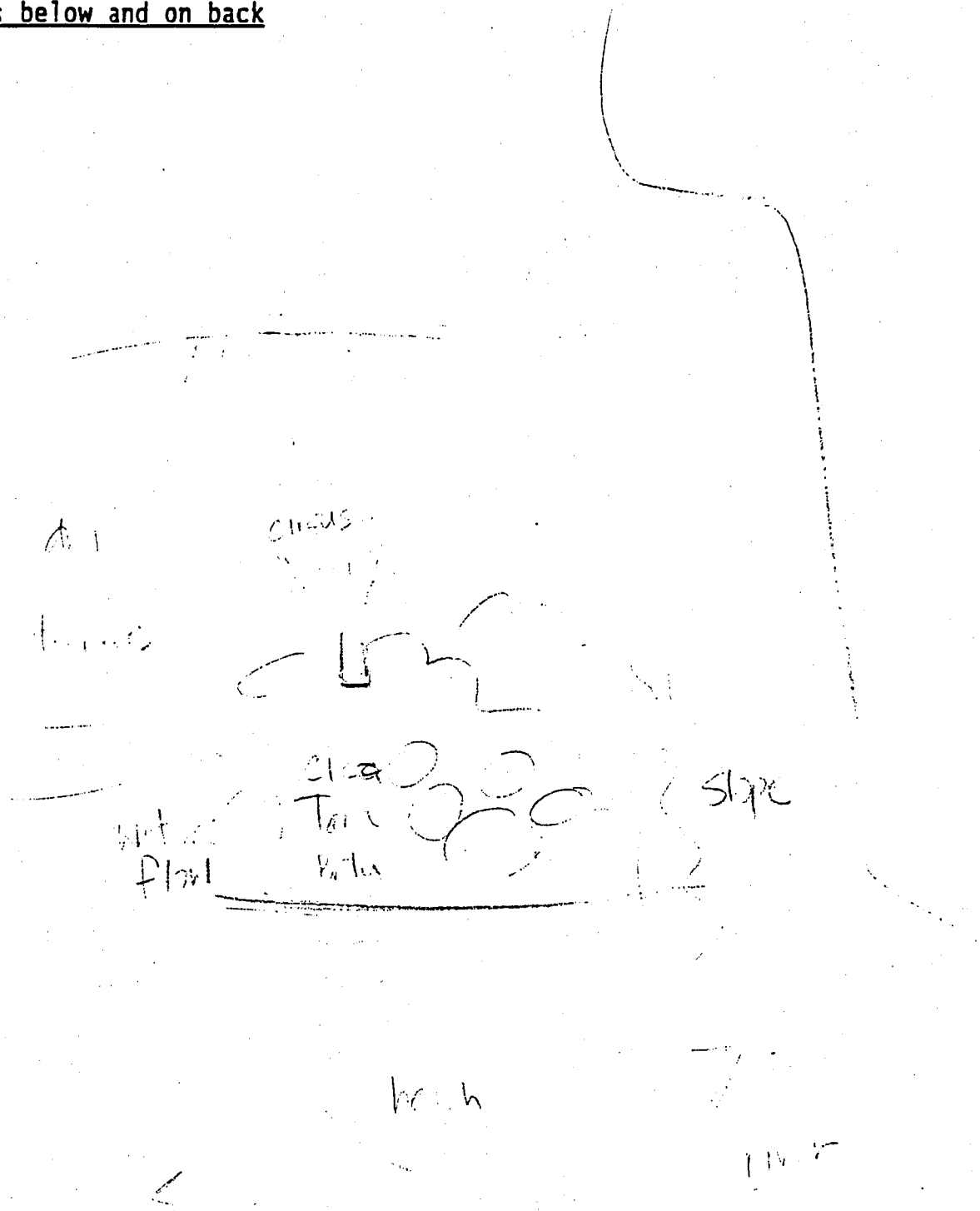


39-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	SS/SR
Location	Spring across from Mitk.it 147 R		
Topo Map	UTM		
Transect/Releve No.	6RCA98-11	Date	5-17-98

Sketches below and on back



39-98

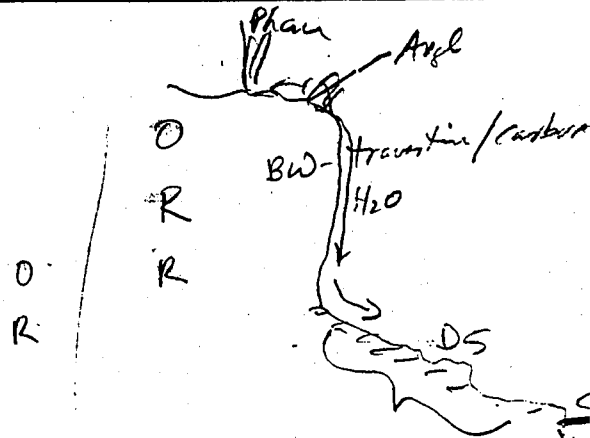
## HANGING GARDEN DATA SHEET

Investigator JS	Date 5-17-98	Releve CPCA 98-11	Record 39-98	
Garden location 147R Springs above/across from Matkat UTM	Aspect 160° NN	Geology muav	Size ≈ 1/2 acre	
Distance from drainage 100'	Structure BW w/ DS below	Elevation	Water flow 45	
Exposure 30				
Disturbance minor slumping in DS, rockfall				
Species	General top of terrace	BW	DS	PP
Adca		u	o	
Ach		u	o	
Cica	C	o	C	
AcAR		R		
Fima	u	-u	u	
Pan. cf. agumentum (Pauc)		-o	o	
Paca		C		
Mica		o	o	
Angl	o		R	
Phia	u			
Ceoc			u	
Thwr			o	
Sephanomera sp. (rustic)		-R		
Imbr			o	
* Tara			C	
Baem			u	
Bria			u	
* Agse			o	
Saex			o	
* M. lotus sp			R	
* Sdas			o	
Sallu		o		

Species	General	BW	DS	PP
Miias			A	
Aspr			R	
Amissonia sp (collected)		R	R	
<del>Ab tri.</del>		R		
Darne			R	
*Aast			O	
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic	-			
algal mat	u			
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
Comments SAPH CANR cottonwood sapling upstream of spring minor rockfall, spring				

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

Egfe  
Epsi  
Rhbe  
Unknown comp



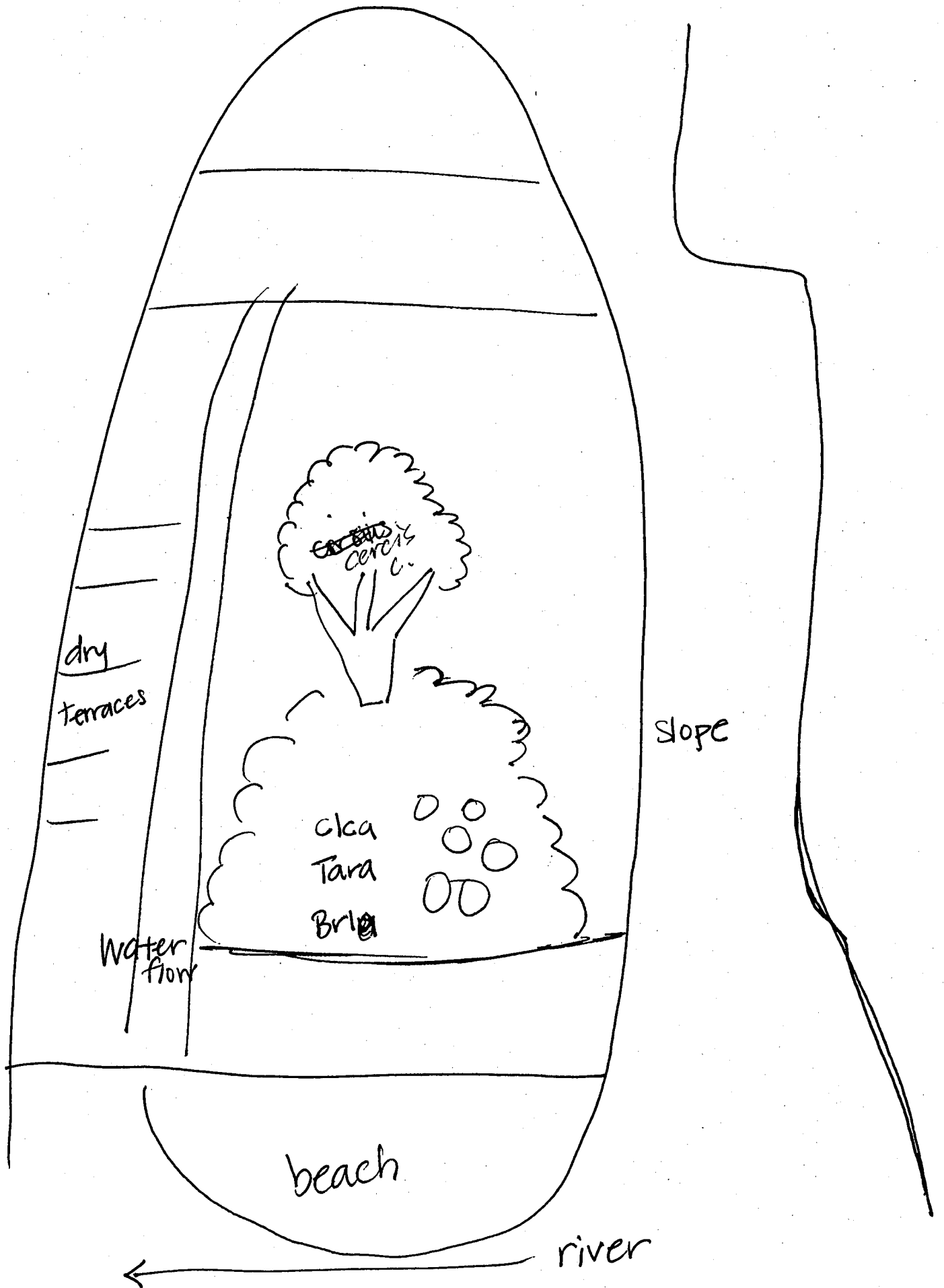
**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site		147R spring G120798-11		Date		Workers			
Site	Temperature	DO	Conductivity	pH					
	20.5	—	1353	7.82					
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	26
								Feb	53
								Mar	56
								Apr	58
								May	64
								June	74
								Jul	74
								Aug	58
								Sep	56
								Oct	43
								Nov	47
								Dec	17

$Q = 427.6 \text{ ml/sec}$

242  
384



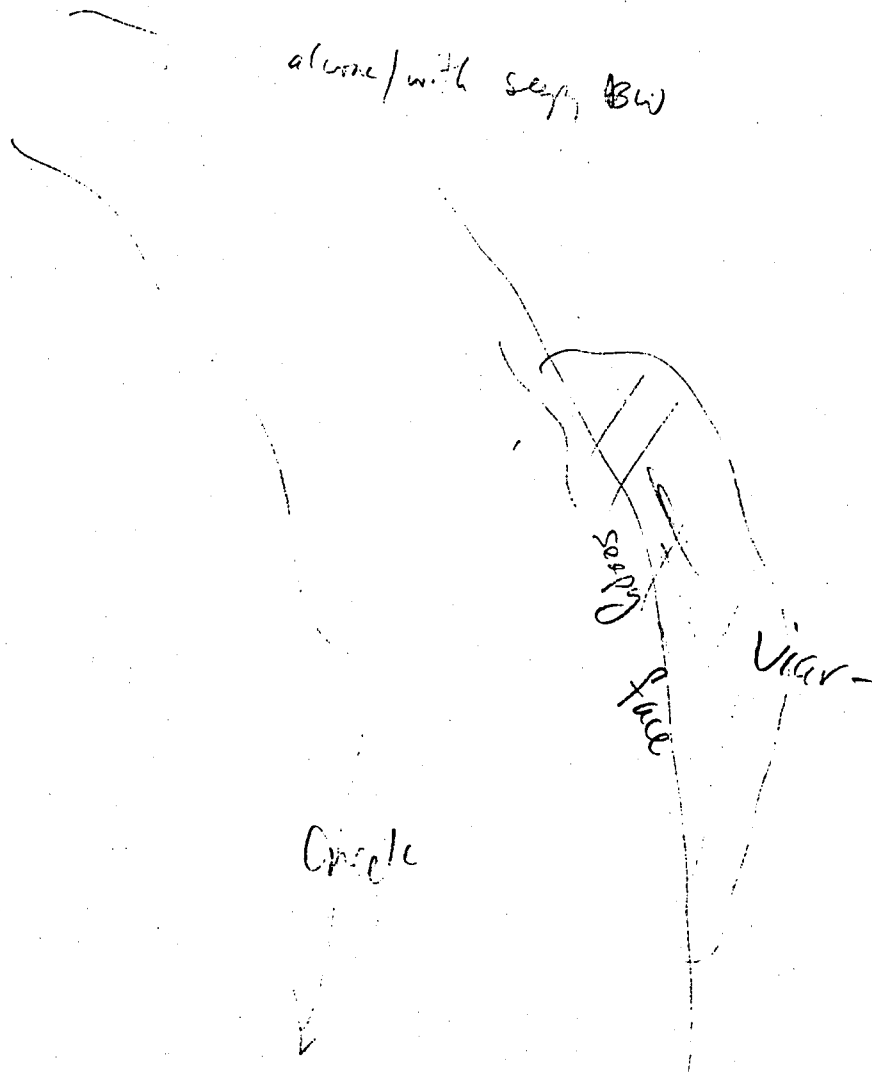


40-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	SSP	Worker	JD
Location	Mt Kat rly mile		
Topo Map	UTM		
Transect/Releve No.	GRCR 498-12	Date	5/17/98

Sketches below and on back



40-98

## HANGING GARDEN DATA SHEET

Investigator	OS SR	Date	5/17/98	Releve	GRC A 98-12	Record	40-98
Garden location	Mait kat ~ 1/4 mile		Aspect	60° WNW	Geology	base of Muas	Size small long ~ 40m x 5m
UTM							
Distance from drainage		Structure	simple alcove + terrace/ps	Elevation		Water flow	1.5
							3-5- 4
Disturbance	rockfall - major flooding trims low edge of DS wired OS/ ledges (terrace-like)						
Species	General	BV	DS	method	PP		
Viar		—		A			
Brto		0		U			
Flma		0		U			
Adca		0		U			
Epa		0		0			
<del>Mait</del> Muas		0		U			
ABDR		—		U			
Mban		—		0			
Prunus		—		R			
Salanum - tall white fl.		—		R			
Ancl		0		U			
Alca		U		0			
Mica		U		0			
Rhbe		—		<del>U</del>			
* Soas		—		R			
LOCA		0		—			
Camissonia - same as 147R		—		0			
Sal. david		0		—			
Aach		0		—			
Argrocin		R		—			
Muth		0		0			

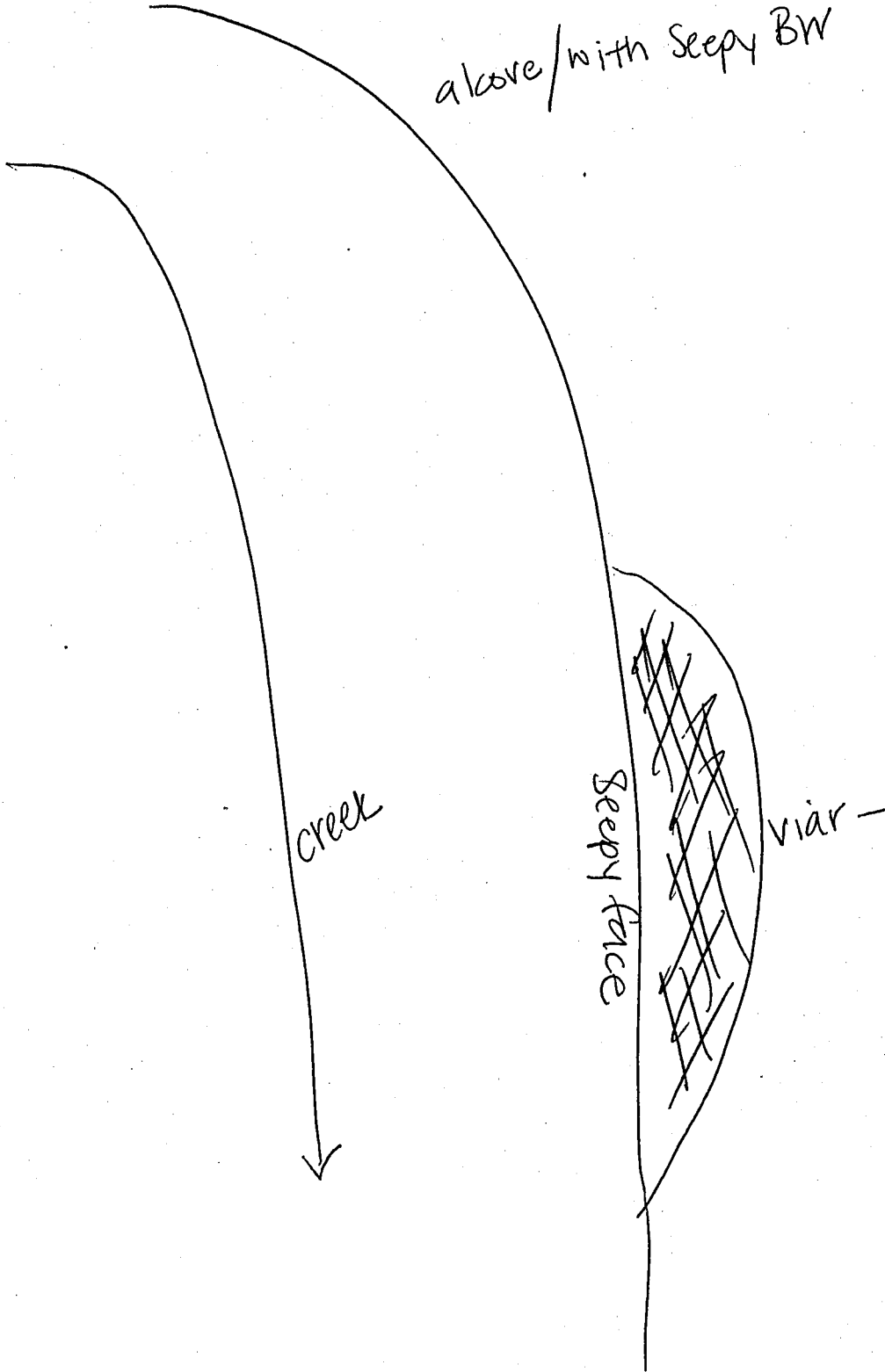
**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

6RCA98-12

Site <i>MatKat - seep ~ 1/4 mile up</i>			Date	Workers					
Site	Temperature	DO	Conductivity	pH					
	16.0	—	1275	8.24					
<b>Water Flow Data (place unit of measurement below Volume)</b>							<b>Solar Pathfinder Data</b>		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	0
								Feb	0
								Mar	0
								Apr	0
								May	14
								June	14
								Jul	14
								Aug	0
								Sep	0
								Oct	0
								Nov	0
								Dec	0

*Q < 10 ml/sec*

alcore / with Seepy BW

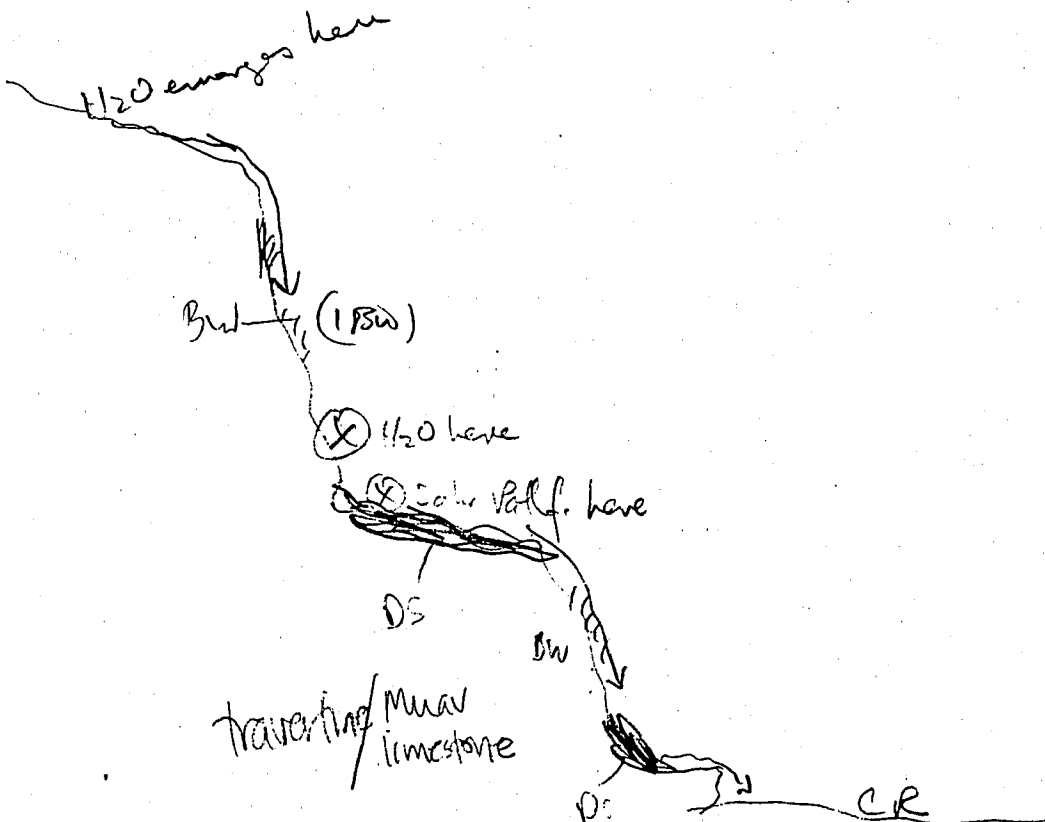


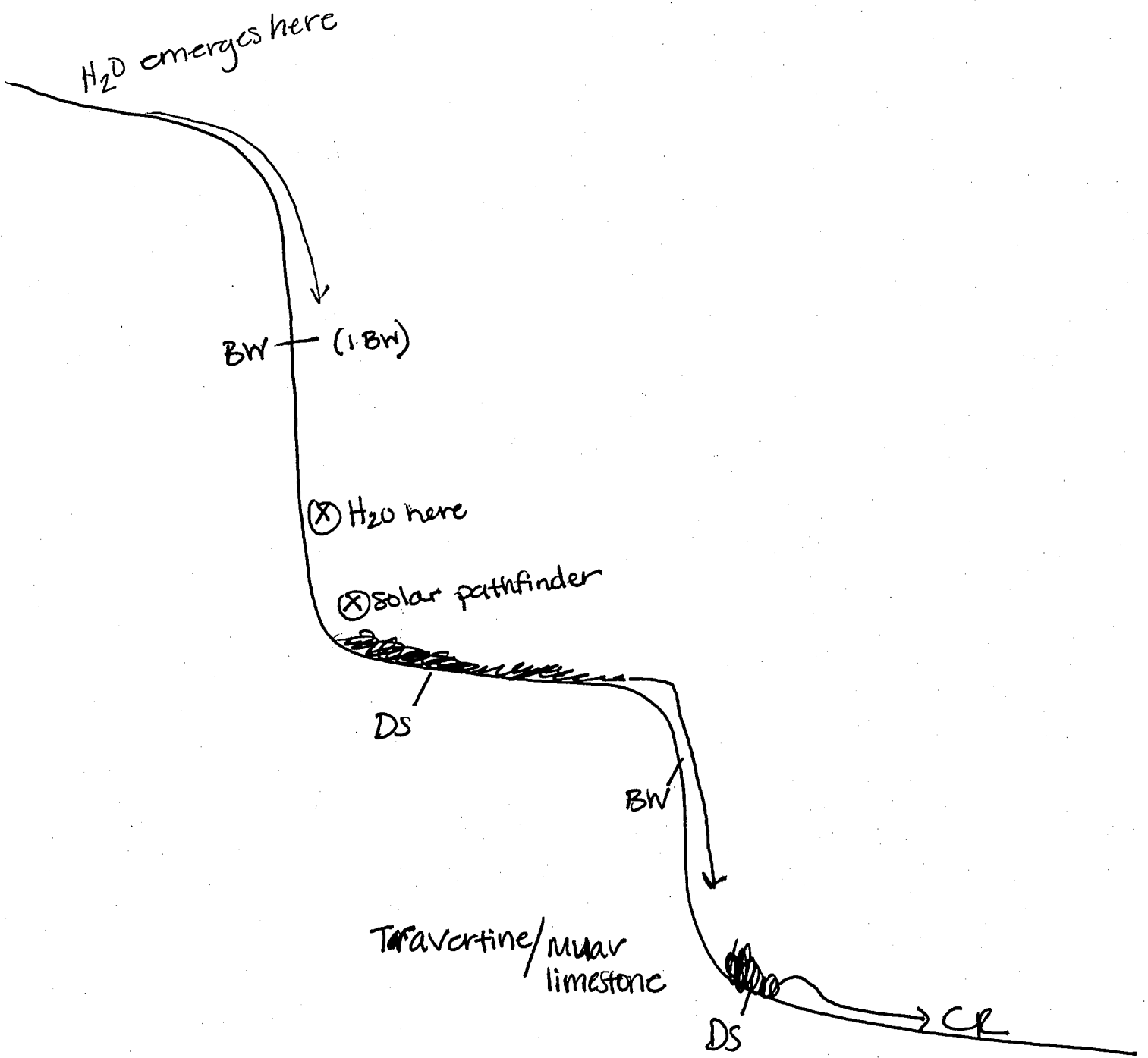
41-98

GLENN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	S&P	Worker	JS/SR
Location	151.5R ledges		
Topo Map			UTM
Transect/Releve No.	GRC98-12 13	Date	5/17/98

Sketches below and on back





H<sub>2</sub>O emerges here

BW (1.8W)

⊗ H<sub>2</sub>O here

⊗ Solar Pathfinder

DS

BW

Travertine/Muar limestone

DS

CR

41-98

HANGING-GARDEN DATA SHEET

Investigator JS/SR		Date 5/17/98		Releve 6RA98-12	Record 41-98
Garden location 151.5R ledges			Aspect 150	Geology Muav + Travertine	Size small ~500m <sup>2</sup>
Distance from drainage ~100'		Structure simple/ scrag	Elevation ~575	Water flow 4.5	Exposure 2.5
Disturbance Bighorn, minor falls, possible flooding, people Canyon Tree frog, MODO, LUWA,					
Species		General	BW	DS	PP pools at top
Side			O	O	
Angle			O	u	
Clca			O	u	C
Auch			O	O	
Bhem			R	u	
Rhbe			O	O	
Turdo			-	-	O
Allea			u	O	
Lora			u	O	
SOSC			C	u	
Flua			u	u	
Eoga			O	O	
<del>Scab</del>					
Phan			-	+R	R
old mustard		(collo)	-	R	
Muth			O	O	
Mucos			-	O	
Thur			-	O	
Aspr			-	O	
Hillvial			-	u	
Pera			O	-	
Nuniesonic			R	R	



**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <i>Ledges</i>		<i>G.C.A. 13 98-13</i>		Date	Workers				
Site	Temperature	DO	Conductivity	pH					
	<i>20.0</i>	<i>—</i>	<i>2020</i>	<i>8.11</i>					
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	<i>42</i>
								Feb	<i>52</i>
								Mar	<i>60</i>
								Apr	<i>54</i>
								May	<i>77</i>
								June	<i>77</i>
								Jul	<i>78</i>
								Aug	<i>58</i>
								Sep	<i>59</i>
								Oct	<i>48</i>
								Nov	<i>41</i>
								Dec	<i>42</i>

$Q = 191.1 \text{ ml/sec}$

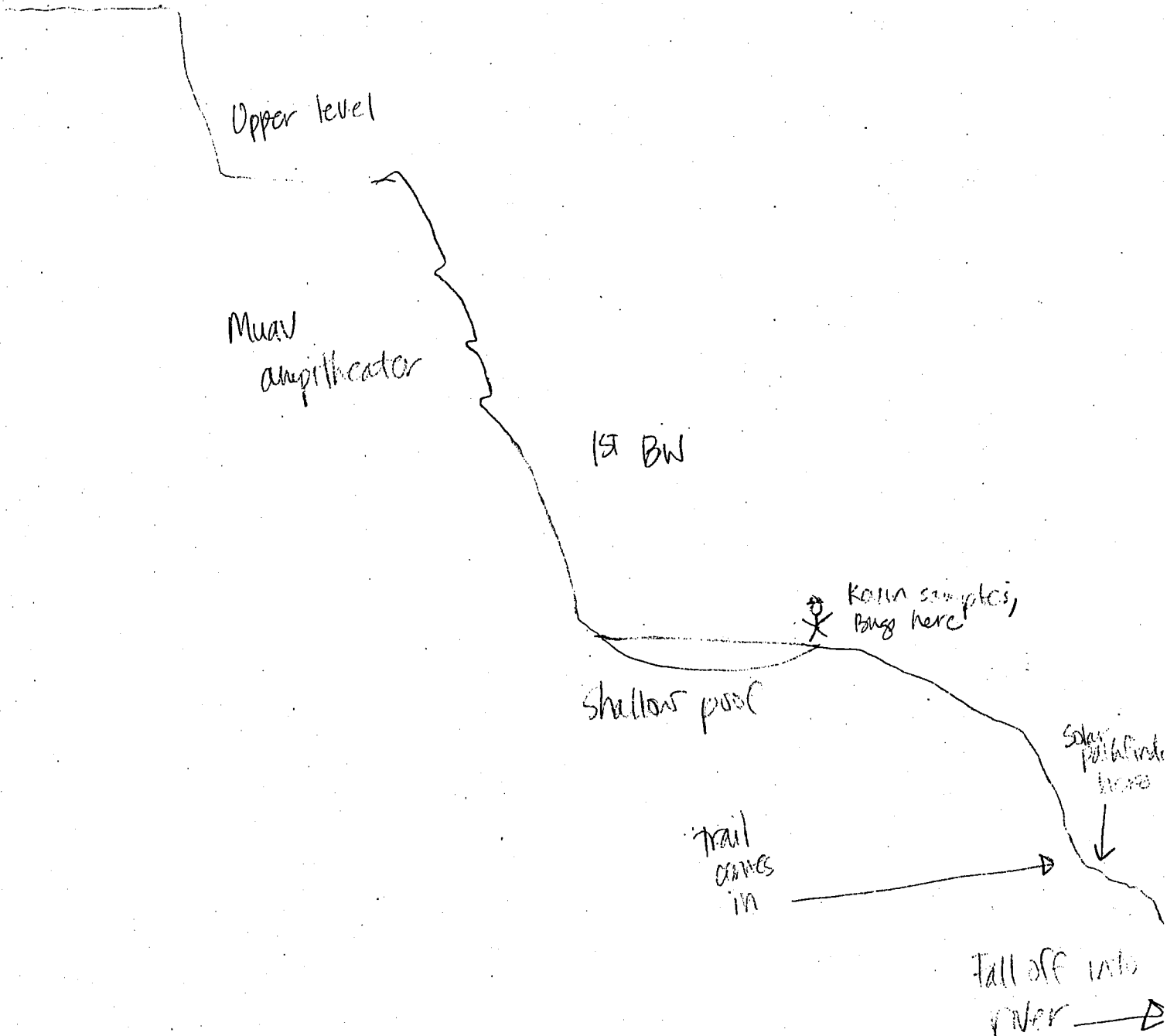
*285  
403*

42-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	Worker SR
Location Slimy Tickle 55R	
Topo Map	UTM
Transect/Releve No.	Date 5-17-98

Sketches below and on back



42-98

HANGING GARDEN DATA SHEET

Investigator JS/SR		Date 5/17/98		Releve 14 GRA 98-13	Record 42-98
Garden location Sling Tick Run 155R			Aspect 140° NW	Geology Muv	Size variable
Distance from drainage ~ 1/4 mile		Structure single Bundled	Elevation 610m	Water flow SO	Exposure 3.5
Disturbance stream feed					
Species					
	General	BW1	BW2	PP below PD	PP long level
Frpe	—	—	—	0	
Adca	0	u	u	R	
Aach	u	u	u	—	
Alca	0	u	u	u	
Aspr	—	—	—	R	
Mica	0	u	u	R	
Eggl	R	u	u	R	
Sidb	—	0	0	0	
Loca	u	0	0	0	
Brlb	—	0	0	0	
Elma	—	0	0	—	
Baem	—	0	0	0	
Tyda	—	—	—	u	
Muth	—	R	—	—	
Canex sp. (coll.)	u	0	0	R	
* Tach	—	—	—	R	
Sasc	—	—	—	u	
* Agve (scam)	—	R	—	0	
Scipus Asten (coll.)	—	—	—	A	
Saex	—	—	—	C	
* Myas	—	—	—	0	
Phan	—	—	—	u	
Angel	—	—	—	0	
Tese	—	—	—	u	

IBW 2nd level

level

may be  
imitator

Funbo  
Myas

GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA

6RCA98-14

Site	Stony Tick	CSECR	Date	5/18/98	Workers	SR/SS
------	------------	-------	------	---------	---------	-------

Site	Temperature	DO	Conductivity	pH
	15.0	—	2650	8.30

Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
--	--	--	--	--	--	-----------------------	--	--	--

Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	30
								Feb	36
								Mar	63
								Apr	64
								May	61
								June	61
								Jul	61
								Aug	58
								Sep	63
								Oct	48
								Nov	29
								Dec	24

Q = 7080 m<sup>3</sup>/sec

230

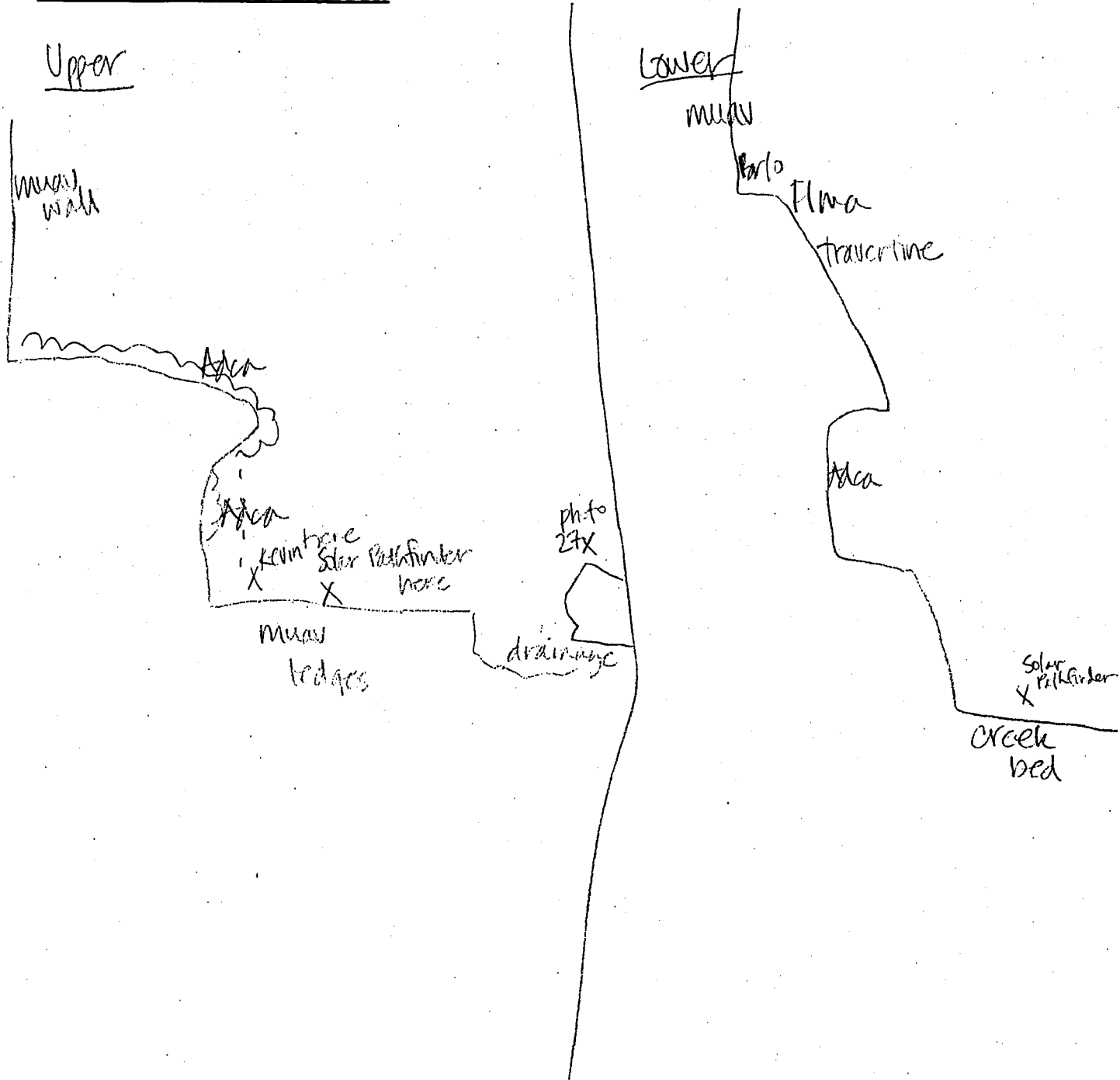
43-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	GRCA98-15	Worker	SR
Location	Fern Glen		
Topo Map	UTM		
Transect/Releve No.	Date 5-19-98		

Sketches below and on back

X Photo 20, 21



43-98

HANGING GARDEN DATA SHEET

Investigator JSI SR		Date 5-19-98		Releve GRCA98-15	Record 43-98
Garden location  Fern Glen		Aspect  Upper 330° Lower SE 135	Geology  middle of mud	Size 30x10m upper 15x25m lower	
Distance from drainage  ~1/4 mile from mouth		Structure  seeps	Elevation	Water flow  2.0	Exposure  1.0
Disturbance People, flash flood CAWR					
combine into Upper BW1 lower					
Species	General	BW	DS	PP BW2	
Adca		A	C	⊗ A	
Mica		U	O	U	
Epgl		O	O	⊗ O	
Flma		O	R	C	
Pela		⊗	R	⊗	
Prlo		⊗		u ⊗	
Muhly sp. (Muar)		⊗		⊗ C	
Angch		F		R	
LOCA		Z		R	
				Muhly sp. 1/2	
(*Agae nearby)					
G3 data					
Pake					
Paul					
Poac (Poc)					

Species	General	BW	DS	PP
Growth form	General	BW	DS	PP
trees				
shrubs				
forbs				
graminoids				
cryptogams lichen moss hepatic				
algal mat				
Physical	General	BW	DS	PP
Litter				
Soil				
Rock				
Comments				

BW=backwall, DS=detritus slope, PP=plunge pool  
COVER: D=dominant (>95%), A=abundant (50-95%), C=common (10-50%),  
U=uncommon (1-10%), O=occasional (<1%), R=rare (<<1%, hard to find)

D  
DS  
Fernblet 7      Fernblet 8

Wtca	O	BU	
Muas	C	O	
Adca	U	A	
Flwa	U	C	
EPB	U	O	
Brlo	O	U	
Loca	O	U	
Poac	O	U	
Rube	O	U	Mchly sp. C

**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <i>Fern Glen GRCA 98-15</i>			Date	Workers					
Site	Temperature	DO	Conductivity	pH					
	<i>14.5 °C</i>	<i>—</i>	<i>2010</i>	<i>8.14</i>					
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time <small>up/swl</small>	Month	Lon% <small>Bro2</small>
							<i>0</i>	Jan	<i>0</i>
							<i>0</i>	Feb	<i>0</i>
							<i>0</i>	Mar	<i>6</i>
							<i>0</i>	Apr	<i>55</i>
							<i>5</i>	May	<i>51</i>
							<i>16</i>	June	<i>46</i>
							<i>5</i>	Jul	<i>51</i>
							<i>0</i>	Aug	<i>48</i>
							<i>0</i>	Sep	<i>47</i>
							<i>0</i>	Oct	<i>0</i>
							<i>0</i>	Nov	<i>0</i>
							<i>0</i>	Dec	<i>0</i>

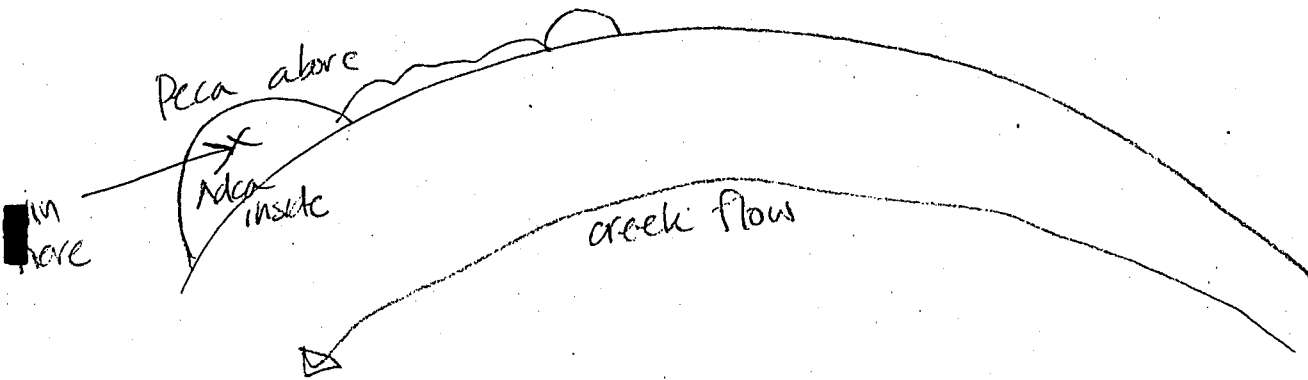


44-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	Worker SR / KB
Location MDHAWK	
Topo Map	UTM
Transect/Releve No. 6/2CA98-16	Date 5-19-98

Sketches below and on back

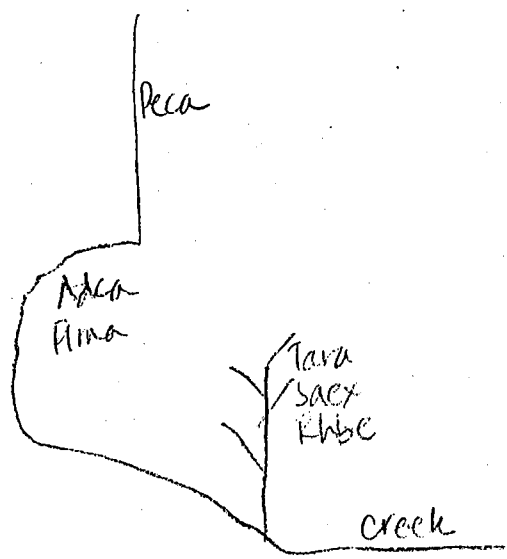


+  
photo  
33

+  
photo  
34

+  
photo  
35

Snake →  
up  
here





**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <i>Mohawk</i>		<i>GRC98-16</i>		Date		Workers			
Site	Temperature	DO	Conductivity	pH					
	<i>16.0</i>	<i>-</i>	<i>2200</i>	<i>8.14</i>					
Water Flow Data (place unit of measurement below Volume)						Solar Pathfinder Data			
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	<i>33</i>
								Feb	<i>36</i>
								Mar	<i>34</i>
								Apr	<i>35</i>
								May	<i>39</i>
								June	<i>39</i>
								Jul	<i>39</i>
								Aug	<i>40</i>
								Sep	<i>40</i>
								Oct	<i>35</i>
								Nov	<i>32</i>
								Dec	<i>33</i>

*Q < 10 ml/sec*

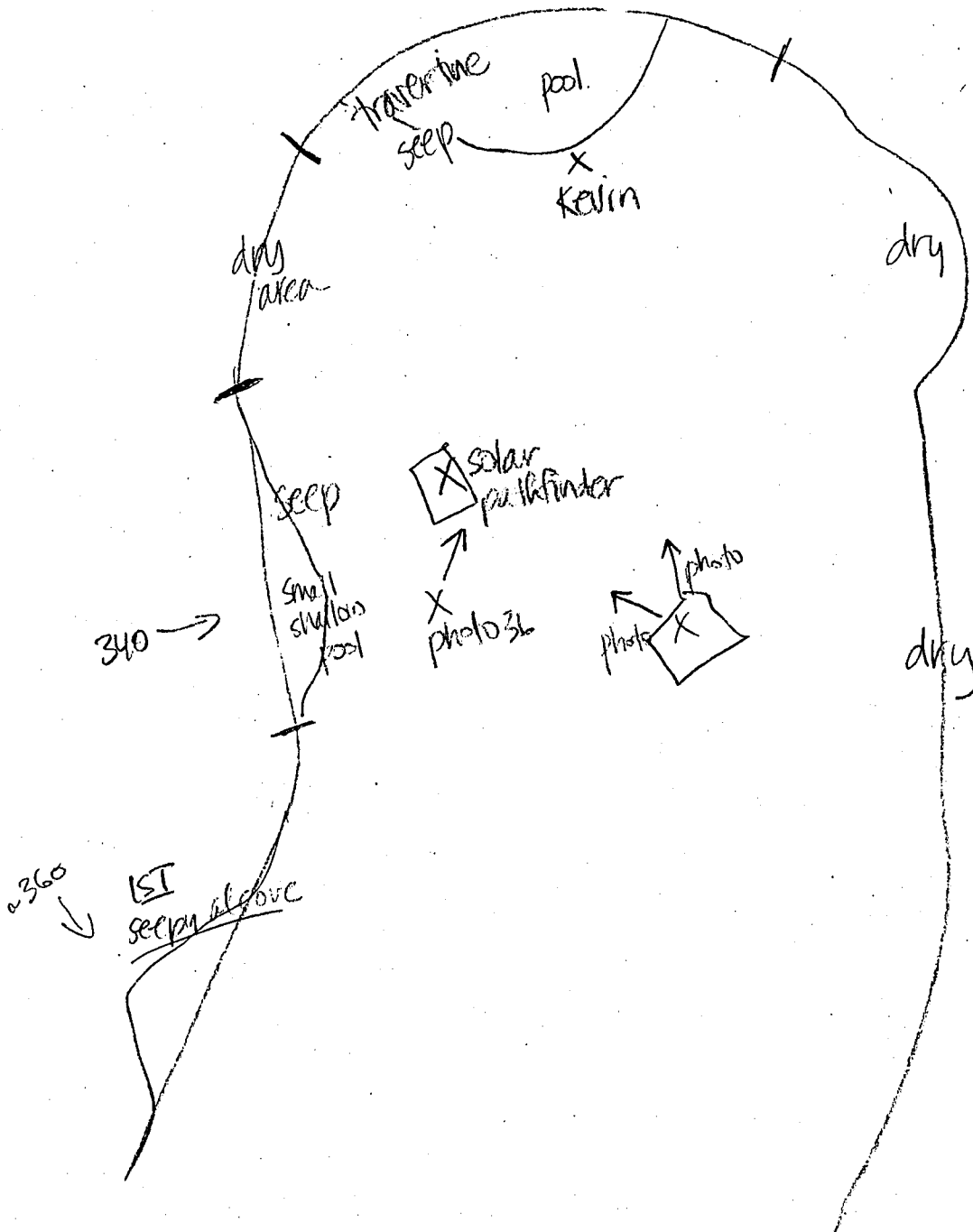
*203 W  
232.5*

4/5/98

**GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM**

Project	Worker
Location <i>Cove Canyon</i>	
Topo Map	UTM
Transect/Releve No. <i>GRC A98-17</i>	Date <i>5/9-98</i>

Sketches below and on back





**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

Site <i>Core Canyon GRCA 98-17</i>			Date	Workers SR					
Site	Temperature	DO	Conductivity	pH					
	<i>17</i>	<i>—</i>	<i>2790</i>	<i>8.43</i>					
Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	<i>26</i>
								Feb	<i>15</i>
								Mar	<i>34</i>
								Apr	<i>32</i>
								May	<i>46</i>
								June	<i>51</i>
								Jul	<i>46</i>
								Aug	<i>41</i>
								Sep	<i>34</i>
								Oct	<i>35</i>
								Nov	<i>16</i>
								Dec	<i>18</i>

*Q = 92.6 ml / sec*

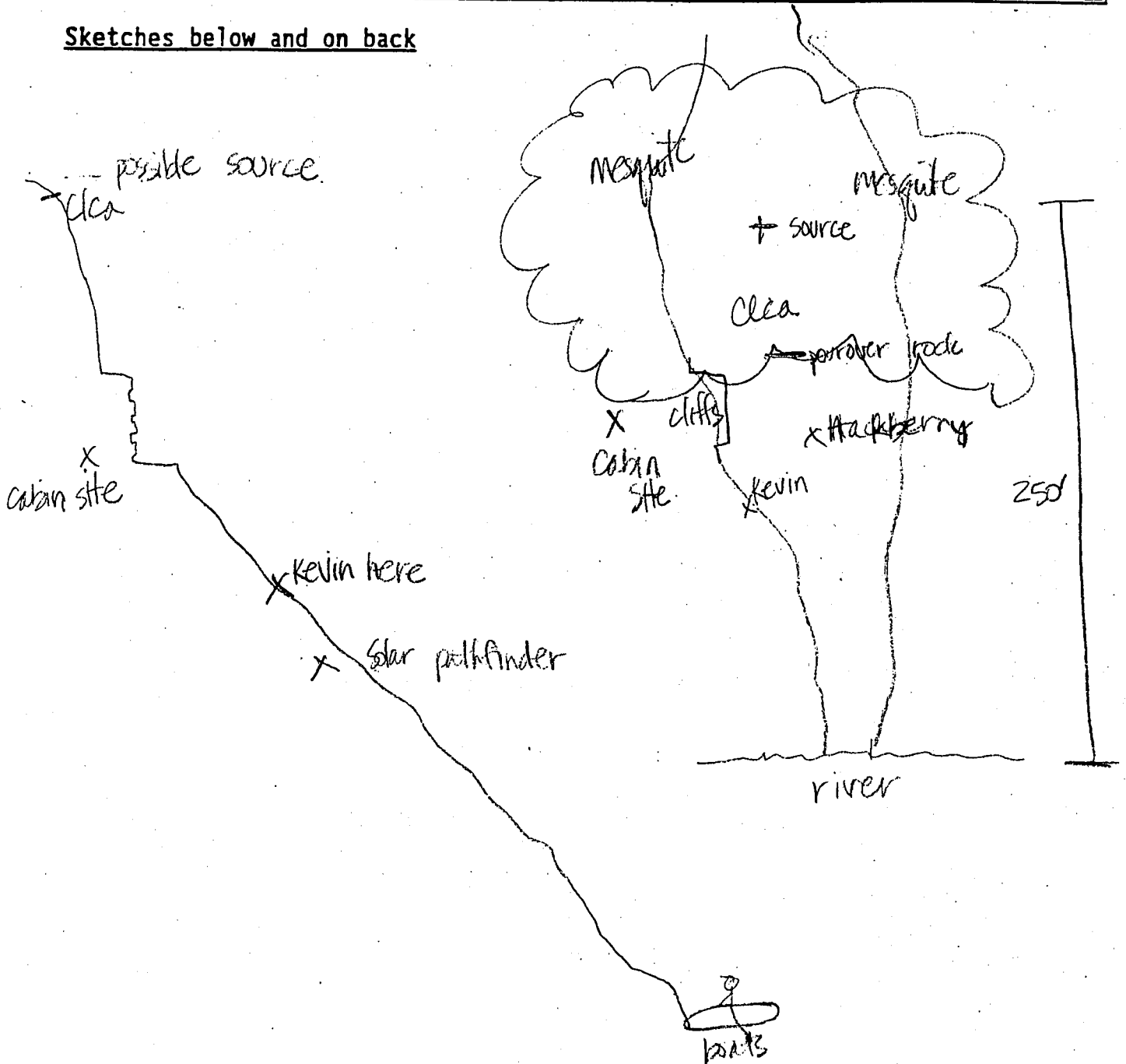
*W 144 24.0  
S 250 41.7*

47-98

GLEN CANYON NATIONAL RECREATION AREA  
PROJECT SITE SKETCH AND LOCATION FORM

Project	GRCA-198	Worker	GH
Location	Across from Pumpkin Springs		
Topo Map	UTM		
Transect/Releve No.	Date 5-21-98		

Sketches below and on back







**GLEN CANYON NATIONAL RECREATION AREA  
WATER AND SOLAR RADIATION DATA**

<b>Site</b> <i>Across from Pumpkin GRCA98-18</i>		<b>Date</b>		<b>Workers</b> <i>SR/KIB</i>	
<b>Site</b>	<b>Temperature</b>	<b>DO</b>	<b>Conductivity</b>	<b>pH</b>	
	<i>18.5°C</i>	<i>-</i>	<i>636</i>	<i>9.22</i>	

Water Flow Data (place unit of measurement below Volume)							Solar Pathfinder Data		
Volume	Time	Volume	Time	Volume	Time	Volume	Time	Month	%
								Jan	<i>60</i>
								Feb	<i>64</i>
								Mar	<i>66</i>
								Apr	<i>73</i>
								May	<i>81</i>
								June	<i>83</i>
								Jul	<i>81</i>
								Aug	<i>71</i>
								Sep	<i>66</i>
								Oct	<i>69</i>
								Nov	<i>58</i>
								Dec	<i>58</i>

*Q < 10 ml/sec*

*W 375 62.5  
S 455 75.8*