

To: Brian Jacobs, Bandelier National Monument
From: Lynette Stevens
Re: July 1996 post-Dome Fire Capulin Canyon sampling trip; September 1996 photo documentation
Date: 19 December 1996
CC: Mark Pearson, Research Associate - Colorado State University
Dr. Will Clements, Professor - Colorado State University

On July 7, 1996, Mark Pearson and I hiked into Capulin canyon to re-sample my thesis field sites following the 1996 Dome Fire. We re-sampled Frijoles creek on July 8, 1996. All sampling procedures were the same as those outlined in my thesis project. Water quality and flow measurements were collected in the field. Water samples and benthic macroinvertebrate samples were collected and brought back to Ft. Collins for lab analyses. The attached spreadsheet lists the water quality and chemistry results. The results of the benthic macroinvertebrate sampling will be available from Mark Pearson (phone: 970-491-5563). A substantial reduction of benthic macroinvertebrates abundance and diversity was noted in Capulin versus Frijoles.

Physical field observation at Capulin include substantial loss of riparian cover and shading, exposing more of the channel to direct sunlight. Tree scars and other indications of an elevated stage of 1.5 to 2 meters were noted. The channel had shifted out of the main channel in several locations. There was evidence of large boulder movement. Shifting bedload was observed, as well as significant losses of instream habitat. The water color in the channel was notably darker, with an orange tint, and had a burnt odor.

On September 8, 1996, I hiked into Capulin Canyon with slides taken in 1994 and 1995 to attempt "before-and-after" photo documentation. Since the channel and riparian vegetation were altered at these sites, it was difficult to find exactly the same position as the "before" slides. The attached slides are my best attempt. The most obvious change is the reduction of riparian cover and shading. Some of the slides also indicate the movement of the channel out of its previous path. I did not sample water chemistry or benthic macroinvertebrates during this site visit.

A more complete report will be prepared to incorporate the results of the benthic macroinvertebrate analyses.

Post-burn data, 1996 - :

STREAM SITE	DATE	Flow (l/sec)	Temp (C)	pH	Conductivity (us/cm)	DO (mg/L)	Alkalinity (mg/L as CaCO3)	Hardness (mg/L as CaCO3)	FC (cts/100 mL)	Ca+ (mg/L)	Mg+ (mg/L)	Na+ (mg/L)	K+ (mg/L)	NH4+ (mg/L)	Cl- (mg/L)	NO3- (mg/L)	SO4- (mg/L)	PO4- (mg/L)	
FRI	1	07/08/96	29.3	18	8.1	110	6.2	47	32	.	9.900	3.291	12.291	1.974	0.308	2.278	<0.010	1.566	<0.002
FRI	2	07/08/96	29.3	17	8.3	120	6.8	51	32	.	9.699	3.339	12.179	1.824	0.307	2.284	<0.010	1.568	<0.002
FRI	3	07/08/96	29.3	15	8.2	110	7.0	52	32	.	8.897	3.233	12.211	1.863	0.305	2.256	<0.010	1.517	<0.002
CAP	1	07/07/96	13.4	23	8.4	420	5.2	204	186	.	59.345	16.329	17.774	7.741	0.433	6.044	<0.010	10.794	0.197
CAP	2	07/07/96	13.4	22	8.4	420	5.1	201	182	.	60.239	16.689	18.066	7.401	0.399	3.338	<0.010	10.191	<0.002
CAP	3	07/07/96	13.4	19	8.4	420	5.6	204	186	.	57.931	16.068	17.895	7.323	0.407	3.537	<0.010	10.803	0.355

NOTES: FRI = Frijoles Canyon, CAP = Capulin Canyon, FC = fecal coliform, < xxx values = less than the given detection limit, "." = not measured.

STREAM	SITE	DATE	Flow (l/sec)	Temp (C)	pH	Conductivity (us/cm)	DO (mg/L)	Alkalinity (mg/L as CaCO3)	Hardness (mg/L as CaCO3)	FC (cts/100 mL)	Ca+ (mg/L)	Mg+ (mg/L)	Na+ (mg/L)	K+ (mg/L)	NH4+ (mg/L)	Cl- (mg/L)	NO3- (mg/L)	SO4- (mg/L)	PO4- (mg/L)
FRI	1	07/09/94	10.5	19	7.3	100	5.8	42	33	222	.	.	.	.	.	.	.	.	.
FRI	2	07/09/94	10.5	20	7.2	100	6.2	43	32	211	.	.	.	.	.	.	.	.	.
FRI	3	07/09/94	10.5	16	7.3	100	6.5	45	36	138	.	.	.	.	.	.	.	.	.
FRI	1	08/27/94	36.5	19	7.6	110	6.3	46	32	56	8.564	2.428	5.641	2.521	<0.001	5.506	<0.010	2.191	0.125
FRI	2	08/27/94	36.5	18	7.5	110	6.6	46	32	30	8.564	2.415	5.679	2.551	<0.001	5.544	<0.010	2.150	<0.002
FRI	3	08/27/94	36.5	15	7.6	110	7.5	48	34	61	9.036	2.415	5.679	2.681	<0.001	5.506	<0.010	2.150	0.125
FRI	1	11/25/94	77.9	2	6.7	100	.	40	32	0	8.426	2.834	10.800	2.310	<0.001	5.667	0.121	4.032	<0.002
FRI	2	11/25/94	77.9	1	6.7	100	.	41	32	6	8.094	2.747	10.590	2.280	<0.001	5.594	<0.010	4.032	<0.002
FRI	3	11/25/94	77.9	1	6.9	100	.	41	34	3	8.205	2.790	11.330	2.330	<0.001	5.649	<0.010	4.200	<0.002
FRI	1	01/02/95	37.7	0	7.2	100	9.8	43	32	.	8.183	2.878	12.180	2.130	<0.001	5.550	0.333	3.360	<0.002
FRI	2	01/02/95	37.7	0	7.1	110	10.5	43	32	.	8.050	2.878	11.970	2.020	<0.001	4.910	0.280	3.276	<0.002
FRI	3	01/02/95	37.7	0	7.2	110	9.4	46	32	.	7.116	2.530	12.400	1.840	<0.001	10.570	0.280	3.360	<0.002
FRI	1	05/12/95	109.6	12	6.7	90	7.4	37	28	14	8.170	2.640	9.180	2.080	<0.001	5.890	<0.010	4.749	<0.002
FRI	2	05/12/95	109.6	11	6.8	90	7.3	36	28	33	8.030	2.640	9.260	2.080	<0.001	6.040	<0.010	5.048	<0.002
FRI	3	05/12/95	109.6	10	7.2	80	7.2	36	28	65	7.890	2.640	8.930	1.980	<0.001	5.890	<0.010	4.680	<0.002
FRI	1	06/10/95	40.8	10	7.0	110	7.0	44	24	72	9.170	3.030	9.840	1.880	<0.001	5.890	<0.010	3.924	<0.002
FRI	2	06/10/95	40.8	12	7.1	110	7.8	44	24	44	10.050	3.320	10.920	2.080	<0.001	6.330	0.026	4.220	<0.002
FRI	3	06/10/95	40.8	10	7.3	110	8.1	44	24	51	9.310	3.090	10.380	1.980	<0.001	6.330	<0.010	4.073	<0.002
FRI	1	08/05/95	11.3	21	7.2	120	6.6	48	28	102	8.838	2.360	<i>10.380</i>	2.609	0.600	3.403	<0.010	1.557	<0.002
FRI	2	08/05/95	11.3	20	7.4	120	6.8	49	32	82	8.406	2.517	<i>10.380</i>	3.753	0.594	4.823	0.054	2.075	<0.002
FRI	3	08/05/95	11.3	18	7.5	110	7.0	49	32	59	9.704	2.649	<i>10.380</i>	3.345	0.596	4.457	<0.010	1.908	<0.002
CAP	1	07/10/94	11.3	16	8.3	100	6.0	53	46	221	.	.	.	.	.	.	.	.	.
CAP	2	07/10/94	11.3	16	7.2	110	6.0	50	48	272	.	.	.	.	.	.	.	.	.
CAP	3	07/10/94	11.3	15	7.8	130	6.5	56	44	275	.	.	.	.	.	.	.	.	.
CAP	1	08/28/94	5.7	18	8.3	130	6.2	65	46	21	13.756	3.018	5.987	2.982	<0.001	2.753	<0.010	2.597	<0.002
CAP	2	08/28/94	5.7	18	8.2	140	6.6	66	46	21	14.015	3.018	5.987	2.962	<0.001	2.714	0.092	2.597	0.125
CAP	3	08/28/94	5.7	16	8.0	140	6.5	66	46	25	14.537	3.085	5.987	2.942	<0.001	2.737	<0.010	2.597	0.125
CAP	1	05/13/95	22.7	14	7.6	130	6.8	53	36	0	11.400	3.380	8.970	2.490	<0.001	2.407	<0.010	5.814	0.020
CAP	2	05/13/95	22.7	13	7.5	130	7.0	53	36	0	12.020	3.440	9.020	2.490	<0.001	2.435	<0.010	5.789	<0.002
CAP	3	05/13/95	22.7	10	7.2	130	7.6	55	36	0	14.400	4.100	10.260	2.900	<0.001	2.801	<0.010	6.499	0.026
CAP	1	06/09/95	21.2	14	7.4	130	5.8	54	24	2	12.960	3.620	9.430	2.390	<0.001	2.647	<0.010	6.217	0.036
CAP	2	06/09/95	21.2	13	7.4	130	6.4	54	24	2	12.960	3.380	9.510	2.390	<0.001	2.880	<0.010	6.634	0.053
CAP	3	06/09/95	21.2	10	7.5	130	6.8	54	24	2	10.790	2.980	7.690	1.880	<0.001	2.287	<0.010	5.342	0.032
CAP	1	08/04/95	5.4	19	7.7	140	7.9	61	42	29	8.600	1.328	<i>8.970</i>	4.063	0.595	2.713	<0.010	3.993	0.095
CAP	2	08/04/95	5.4	16	7.8	140	7.5	61	42	26	9.400	1.329	<i>8.970</i>	4.068	0.596	3.325	<0.010	4.690	<0.002
CAP	3	08/04/95	5.4	16	7.6	140	6.9	61	42	34	5.800	2.306	<i>8.970</i>	3.082	0.602	1.925	0.074	2.678	<0.002

NOTES: FRI = Frijoles Canyon, CAP = Capulin Canyon, FC = fecal coliform, < xxx values = less than the given detection limit, "." = not measured.
Italized sodium values are medians of above concentrations (original concentrations were deemed erroneous due to suspected calibration error).

CAP1

13May1995



8Sep1996



13May1995



8Sep1996

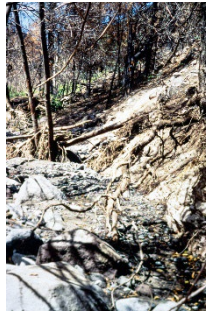


CAP3

13May1995



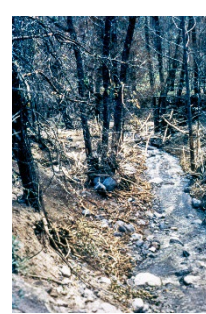
8Sep1996



13May1995



8Sep1996

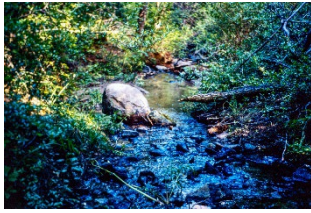


8Sep1996



CAP2

27May1994



8Sep1996



8Sep1996



Capulin Canyon 7July1996



United States Department of the Interior
National Park Service - Bandelier National Monument
APPLICATION FOR PERMISSION TO COLLECT
SPECIMENS OF PLANTS, ANIMALS, ROCKS, OR MINERALS

Name of Applicant <u>Lynette Stevens</u>	Home Address <u>516 W. Magnolia Fl. Collins, CO 80521</u>
Representing (Name of Institution) <u>CSU</u>	Application Date <u>6/28/96</u>
Specimens to be Collected (Type and Quantity) <u>Aquatic Invertebrates</u>	
Other Applicable Collection Permits	
Federal Agency: No: _____ Expir. Date: _____	State Agency: No: _____ Expir. Date: _____
Research Topic/Reason for Collecting within this Area <u>Water Quality Study</u>	Proposed Collecting Dates From: <u>7/1/96</u> To: <u>12/30/96</u>
Place where Specimens are to be Deposited (see 36 CFR Chap. 1. Sect. 2.5(g)(1)) <u>Destructive Samples</u>	
I, the applicant, having read the conditions on the reverse of the permit relating to research and collections within areas administered by the Southwest Region of the National Park Service, agree that, if the permit is granted, I will comply with all the conditions stated therein.	
Signed: <u>Lynette Stevens</u>	Date: <u>7/5/96</u>

TO BE FILLED IN BY ISSUING OFFICE - DO NOT WRITE BELOW THIS POINT

Approved for Collecting Following Specimens (Type and Quantity)

Approved for Collecting Following Specimens (Type and Quantity) <u>Aquatic Invertebrates, Capulin and Frigoles Canyon</u>	
Locality of Collecting Limited to <u>Frigoles + Capulin</u>	Permit Number BAND- <u>COLL-96-05</u>
Special Conditions or Restrictions	Expiration Date <u>12/31/96</u>
Recommended by (Signature and Title) <u>Bruce H Nat Res Spec.</u>	Copies of this permit sent to appropriate State and other Federal agencies, if applicable? Yes _____ No <u>X</u>
Approved by (Signature of Superintendent) <u>[Signature]</u>	Date <u>6/27/96</u>
United States Department of the Interior National Park Service, Southwest Region	COLLECTING PERMIT NO. BAND- <u>COLL-96-05</u>
In accordance with the stipulations, conditions, and restrictions on the back of this permit, permission is granted to	
Name of Collector (and Assistants if Applicable) <u>Lynette Stevens</u>	Date Issued

To Collect the Following Specimens

To Collect the Following Specimens <u>Aquatic Invertebrates</u>	
Locality of Collecting Limited to <u>Frigoles + Capulin</u>	Permit Expiration Date <u>12/30/96</u>
Special Conditions or Restrictions <u>See reverse</u>	
Approved (Signature) <u>[Signature]</u>	Title <u>Acting SJAT</u>

THIS PERMIT MUST BE CARRIED AT ALL TIMES WHILE COLLECTING INSIDE THE MONUMENT. THIS PERMIT DOES NOT COVER THE COLLECTION OF RARE, THREATENED, OR ENDANGERED SPECIES. SEE REVERSE FOR STIPULATIONS AND CONDITIONS APPLICABLE TO THIS APPROVED PERMIT.