LANL TA-00 2002

ENVIRONMENTAL RESTORATION PROJECT

Los Alamos National Laboratory/University of California
Risk Reduction & Environmental Stewardship (RRES)
Environmental Restoration (ER) Project, MS M992
Los Alamos, New Mexico 87545
(505) 667-0808/FAX (505) 665-4747

U.S. Department of Energy
Office of Los Alamos Site Operations, MS A316
Environmental Restoration Program
Los Alamos, New Mexico 87544
(505) 667-7203/FAX (505) 665-4504

Date: September 30, 2002
Refer to: ER2002-0683

RECEIVED SEP 2002

Mr. John Young, Corrective Action Project Leader
Permits Management Program
NMED – Hazardous Waste Bureau
2905 Rodeo Park Drive East
Building 1
Santa Fe, NM 87505-6303

SUBJECT: LOS ALAMOS NATIONAL LABORATORY PERMIT MODIFICATION REQUEST, SEPTEMBER 2002

Dear Mr. Young:

In accordance with 20 NMAC 4.1 Subparts IX and X, et. seq., the Department of Energy and the Los Alamos National Laboratory request a Class III permit modification to the Hazardous and Solid Waste Amendments (HSWA) Module VIII of the Laboratory's Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility permit. A Class III permit modification request is the appropriate vehicle to remove these units from the permit.

This Class III permit modification requests the removal of 9 Solid Waste Management Units (SWMUs) from the permit. As described in the table that follows, 3 of the SWMUs are discrete units and 6 are components of consolidated units. Both the discrete and consolidated units have been investigated and recommended for no further action (NFA) in a RCRA facility investigation (RFI) work plan, RFI report, or a voluntary corrective action completion report. The New Mexico Environment Department Hazardous Waste Bureau has concurred with the determination that NFA is appropriate for the discrete unit or the entire consolidated unit via approval of the aforementioned reports. A copy of each approval letter is attached.

The facility will publish in local newspapers a notice of the modification required and will send notices to all persons on the facility mailing list, which will contain, at a minimum, all information as prescribed in 20 NMAC 4.1 Subpart IX, Subsection 901B.

If you have any further questions regarding the permit modification, please contact Linda Nonno at (505) 665-0725.

SWMUs Requested for Removal from Module VIII of the Permit

SWMU	Date of NMED Approval Letter	Associated Consolidated Unit
SWMU 00-003 SWMU 00-012	January 30, 2002	00-003-99
SWMU 00-019	May 28, 2002	*
SWMU 00-028(a) SWMU 00-028(b)	March 7, 2002	00-028(a)-00
SWMU 01-001(m)	November 29, 2000	*
SWMU 21-029	January 14, 2002	*
SWMU 54-007(c)	June 20, 2002	54-007(c)-99
SWMU 73-005	March 28, 2001	73-005-99

* Not applicable, this SWMU is a discrete unit.

Sincerely,

David McInroy, Acting Program Manager
Environmental Restoration Project
Los Alamos National Laboratory

Sincerely,

Everett Trollinger, Project Manager
Department of Energy
Office of Los Alamos Site Operations

DM/ET/LN/vn

Attachments: 1) 7 Letters of Approval
2) Requested Modifications to Tables A, B and C of Module VIII
3) Proposed Tables A, B and C of Module VIII

Cy (w/enc.):
M. Boettner, RRES-R, MS M992
M. Kirsch, RRES-R, MS M992
S. Martinez, RRES-R, MS M707
D. McInroy, RRES-R, MS M992
L. Nonno, RRES-R, MS M992
J. White, ESH-19, MS K498
D. Gregory, OLASO, MS A316
E. Trollinger, OLASO, MS A316
T. Trujillo, DOE-AL, MS A906
G. Turner, OLASO, MS A316
L. King, US EPA
J. Davis, NMED-SWQB, MS J993
T. Longo, DOE-HQ, EM 453
S. Yanicak, NMED-DOE OB, MS J993
RPF, MS M707
IM-5, MS A150
RRES-R File, MS M992

Cy (w/o enc.):
S. Boliver, RRES-R MS M992
A. Dorries, RRES-R MS M992
D. Hickmott, RRES-R MS M992
J. Hopkins, RRES-R MS M992
J. McCann, RRES-R MS M992
J. Parker, NMED-AIP, MS J993
A. Pratt, RRES-R MS M992
B. Ramsey, RRES-DO, MS J591
K. West, PM/PPC, MS M992
J. Bearzi, NMED-HRMB

Request for Permit Modification
September 2002

Letters of Approval

ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
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Fax (505) 428-2567
www.nmenv.state.nm.us

GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
SECRETARY

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

January 30, 2002

Dr. John Browne, Director
Los Alamos National Laboratory
P. O. Box 1663, Mail Stop A100
Los Alamos, New Mexico 87545

Mr. Mat Johansen, Project Manager
Department of Energy Los Alamos Area Office
528 35th Street, Mail Stop A316
Los Alamos, New Mexico 87544

RE: APPROVAL OF VCA COMPLETION REPORT FOR CONSOLIDATED UNIT 00-003-99 (PRS 0-003 AND PRS 0-012) AND PRS 0-030(i)
LOS ALAMOS NATIONAL LABORATORY EPA ID # NM0890010515
TASK NUMBER: HWB-LANL-01-008

Dear Dr. Browne and Mr. Johansen:

The Hazardous Waste Bureau (HWB) of the New Mexico Environment Department has reviewed Los Alamos National Laboratory's (LANL) document entitled VCA Completion Report for Consolidated Unit 00-003-99 (PRS 0-003 and PRS 0-012) and PRS 0-030(i) (referenced by LA-UR-01-2034 and ER2001-0347). HWB reviewed and approves the VCA Completion Report for Consolidated Unit 00-003-99 (PRS 0-003 and PRS 0-012) and PRS 0-030(i). The approval also includes a record of communication entitled Record of Communication for Informal Comments for the VCA Completion Report for Consolidated Unit 00-003-99 (PRS 0-003 and PRS 0-012) and PRS 0-030(i) dated January 15, 2002.

If you have any questions or concerns regarding this approval, please contact me at (505) 428-2538 or Vickie Maranville at (505) 428-2532.

Sincerely,

John Young
Corrective Action Project Leader
Permits Management Program

JY:vm

Cc: V. Maranville, NMED HWB
J. Parker, NMED DOE OB
S. Yanicak, NMED DOE OB
J. Davis, NMED SWQB
D. Neleigh, EPA 6PD-N
J. Vozella, DOE LAAO, MS A316
J. Canepa, LANL E/ER, MS M992
M. Kirsch, LANL E/ER, MS M992
D. McInroy, LANL E/ER, MS M992
File: Reading and HSWA LANL 1/1071/00-003-99 and 0-030(i)

ENVIRONMENT DEPARTMENT
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GARY E. JOHNSON
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PETER MAGGIORE
SECRETARY

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

May 28, 2002

Everett Trollinger, Project Manager
Office of Los Alamos Site Operations
Department of Energy
528 35th Street, Mail Stop A316
Los Alamos, NM 87544

Dr. John C. Browne, Director
Los Alamos National Laboratory
P.O. Box 1663, Mail Stop A100
Los Alamos, NM 87545

RE: APPROVAL OF THE VOLUNTARY CORRECTIVE ACTION COMPLETION REPORT FOR POTENTIAL RELEASE SITE 0-019
LOS ALAMOS NATIONAL LABORATORY, NM0890010515
HWB-LANL-01-023

Dear Mr. Trollinger and Dr. Browne:

The Hazardous Waste Bureau (HWB) of the New Mexico Environment Department is in receipt of the Voluntary Corrective Action Completion Report for Potential Release Site 0-019, dated September 2001 and referenced by LA-UR-01-4140 (ER2001-0603), and the Response to the Request for Supplemental Information, dated March 26, 2002 and referenced by ER2002-0227. HWB has reviewed and approves these documents.

Should you have any questions, please feel free to contact Ms. Darlene Goering at (505) 428-2548 or me at (505) 428-2538.

Sincerely,

John Young
LANL Corrective Action Project Leader
Permits Management Program

JY:dxg

cc: J. Bearzi, NMED HWB
J. Davis, NMED SWQB
J. Parker, NMED DOE OB
S. Yanicak, NMED DOE OB, MS J993
L. King, EPA 6PD-N
J. Vozella, DOE LAAO, MS-A316
J. Canepa, LANL E/ER, MS-M992
M. Kirsch, LANL E/ER, MS-M992
D. McInroy, LANL E/ER, MS-M992
file: Reading LANL TA:0 (0-019, Former Central Waste Water Treatment Plant)

State of New Mexico
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GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
SECRETARY

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

March 7, 2002

Mat Johansen, Project Manager
Los Alamos Area Office
Department of Energy
528 35th Street, Mail Stop A316
Los Alamos, NM 87544

Dr. John C. Browne, Director
Los Alamos National Laboratory
P.O. Box 1663, Mail Stop A100
Los Alamos, NM 87545

RE: APPROVAL OF THE RFI REPORT FOR POTENTIAL RELEASE SITES 0-028(a,b)
LOS ALAMOS NATIONAL LABORATORY, NM0890010515
HWB-LANL-01-025

Dear Mr. Johansen and Dr. Browne:

The Hazardous Waste Bureau (HWB) of the New Mexico Environment Department is in receipt of the RFI Report for Potential Release Sites 0-028(a,b) dated July, 1996 and referenced by LA-UR-96-2421, the Response to the NOD for TA-0, PRSs 0-028(a,b) RFI Report (Former Operable Unit 1071), dated March 24, 1997 and referenced by EM/ER:97-086, the Response to the NOD for the RFI Report for PRSs 0-028(a,b) in TA-0 (Former OU 1071), dated November 5, 1997 and referenced by EM/ER:97-436, and the Response to Request for Supplemental Information, Response to the 2nd NOD for Potential Release Sites 00-028(a,b), RCRA Facilities Investigation Report, dated December 19, 2001 and refenced by ER2001-1014. HWB has reviewed and approves these documents.

Should you have any questions, please feel free to contact Darlene Goering at (505) 428-2548 or me at (505) 428-2538.

Sincerely,

John Young
LANL Corrective Action Project Leader
Permits Management Program

JY:dxg

cc: J. Bearzi, NMED HWB
J. Davis, NMED SWQB
J. Parker, NMED DOE OB
S. Yanicak, NMED DOE OB, MS J993
D. Neleigh, EPA 6PD-N
J. Vozella, DOE LAAO, MS-A316
[redacted]
M. Kirsch, LANL E/ER, MS-M992
D. McInroy, LANL E/ER, MS-M992
file: Reading LANL TA:0 (0-028(a,b), Golf Course)

State of New Mexico
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GARY E. JOHNSON
GOVERNOR

Attachment I
01-001(m)

PETER MAGGIORE
SECRETARY

PAUL R. RITZMA
DEPUTY SECRETARY

RCV'D 12/1/00

CERTIFIED MAIL
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November 29, 2000

John C. Browne, Director
Los Alamos National Laboratory
P.O. Box 1663, Mail Stop A100
Los Alamos, NM 87545

Theodore J. Taylor, Project Manager
Los Alamos Area Office
Department of Energy
528 35th Street, Mail Stop A316
Los Alamos, NM 87544

RE: APPROVAL OF NO FURTHER ACTION FOR POTENTIAL RELEASE SITE 01-001(m), SEPTIC TANK 275
LOS ALAMOS NATIONAL LABORATORY
NM 0890010515
HWB-LANL-00-014

Dear Dr. Browne and Mr. Taylor:

The Hazardous Waste Bureau (HWB) of New Mexico Environment Department has received the "Additional Information for Potential Release Site (PRS) 01-001(m), Septic Tank 275, on Rollin Jones Property" dated October 23, 2000 and referenced by ER2000-0581. HWB has reviewed the information provided and concurs with the Los Alamos National Laboratory Environment Restoration Project's position that Septic Tank 275 was never installed. The septic tank is appropriate for a no further action recommendation under criterion 1.

If you have any questions please contact me at (505) 827-1558 extension 1036 or Neelam Dhawan at extension 1018.

Sincerely,

John R. Young,
Corrective Action Project leader
RCRA Permits Management Program

JRY:nmd

cc: P. Allen, NMED HWB
J. Bearzi, NMED HWB
J. Kieling, NMED HWB
C. Will, NMED HWB
J. Parker, NMED DOE-OB
S. Yanicak, NMED DOE-OB
J. Davis, NMED SWQB
M. Leavitt, NMED GWQB
D. Neleigh, EPA 6PD-N
J.Vozella, DOE LAAO, MS-A316
J. Canepa, LANL E/ER, MS-M992
M. Kirsch, LANL EM/ER, MS-M992
D. McInroy, LANL E/ER, MS-M992
File: HSWA LANL, 1/1078/1

E VIRONMENT DEPARTMEN

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GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
SECRETARY

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02 JAN 16 PM 12:31

January 14, 2002

Dr. John Browne, Director
Los Alamos National Laboratory
P. O. Box 1663, Mail Stop A100
Los Alamos, New Mexico 87545

Mr. Mat Johansen, Project Manager
Department of Energy Los Alamos Area Office
528 35th Street, Mail Stop A316
Los Alamos, New Mexico 87544

RE: APPROVAL OF PHASE II RFI REPORT FOR POTENTIAL RELEASE SITE 21-029, DP TANK FARM
LOS ALAMOS NATIONAL LABORATORY EPA ID # NM0890010515
TASK NUMBER HWB-LANL-01-016

Dear Dr. Browne and Mr. Johansen:

The Hazardous Waste Bureau (HWB) of the New Mexico Environment Department (NMED) has reviewed Los Alamos National Laboratory's (LANL) document entitled Phase II RFI Report for Potential Release Site 21-029, DP Tank Farm, dated September 2001 (referenced by LA-UR-01-5254 and ER2001-0720). HWB requested supplemental information (RSI) on November 8, 2001. LANL provided a response to the RSI on December 13, 2001 (referenced by ER2001-1023).

HWB has reviewed the report and the RSI response provided by LANL and hereby approves the Phase II RFI Report for Potential Release Site 21-029, DP Tank Farm as well as the supporting documentation submitted to HWB.

If you have any questions or concerns regarding this approval, please contact me at (505) 428-2538 or Vickie Maranville at (505) 428-2532.

Sincerely,

John Young
Corrective Action Project Leader
Permits Management Program

JY:vm

Cc: J. Kieling, NMED HWB
V. Maranville, NMED HWB
J. Parker, NMED DOE OB
S. Yanicak, NMED DOE OB
J. Davis, NMED SWQB
D. Neleigh, EPA 6PD-N
J. Vozella, DOE LAAO, MS A316
J. Canepa, LANL E/ER, MS M992
M. Kirsch, LANL E/ER, MS M992
D. McInroy, LANL E/ER, MS M992
File: Reading and HSWA LANL 1/1106/21-029

State of New Mexico
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GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
SECRETARY

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

June 20, 2002

Dr. John C. Browne, Director
Los Alamos National Laboratory
P.O. Box 1663, Mail Stop A100
Los Alamos, New Mexico 87545

Mr. Everett Trollinger, Project Manager
Office of Los Alamos Site Operations
Department of Energy
528 35th Street, Mail Stop A316
Los Alamos, New Mexico 87544

SUBJECT: APPROVAL OF VOLUNTARY CORRECTIVE ACTION REPORT (VCA) FOR POTENTIAL RELEASE SITE (PRS) 54-007(C)-99 LOS ALAMOS NATIONAL LABORATORY, NM0890010515 HWB-LANL-01-017

Dear Dr. Browne and Mr. Trollinger:

The New Mexico Environment Department (NMED) has reviewed and is approving the Los Alamos National Laboratory's (LANL's) Voluntary Corrective Action (VCA) Completion Report for potential release site (PRS) 54-007(c)-99. The consolidated PRS 54-007(c)-99 consists of two inactive septic systems; solid waste management unit (SWMU) 54-007(c) and Area of Concern (AOC) 54-007(e). Both the septic tanks were removed during remediation activities. Although organic chemicals were detected in the sludge remaining in the tanks and in the soil in and around the drainfields of both the septic systems (SWMU 54-007(c) and AOC 54-007(e)), the detected concentrations were low and do not pose a threat to the human health or the environment.

NMED reviewed LANL's " Voluntary Corrective Action (VCA) Completion Report PRS 54-007(c)-99", dated September 2001 and referenced by LA-UR-01-5311 (ER2001-0625) and sent a request for supplemental information (RSI) on December 10, 2001. A subsequent thirty-day extension request by LANL to respond to the RSI was approved by NMED on December 27, 2001. In response to the RSI, LANL submitted response to the comments (referenced by ER2002-0106) and a Revised VCA Report entitled " Voluntary Correction Action Completion Report for PRS 54-007(c)-99 Revision 1" on February 8, 2002 (referenced by LA-UR-02-0635 and ER2002-0025). NMED reviewed the documents and met with LANL staff on April 5, 2002 and provided verbal comments on LANL's RSI response and the revised VCA Report. Subsequently on May 31, 2002, LANL submitted "Resolution of Comments on Revision 1 of the Voluntary Corrective Action (VCA) Completion Report for Potential Release Site (PRS) 54-007(c)-99" (referenced by ER2002-0374). NMED is satisfied with the resolution of comments and concurs with LANL that the site does not pose any risk to human health and the environment.

If you have any questions, please contact Neelam Dhawan of my staff at (505) 428-2540.

Sincerely,

John Young
LANL Corrective Action Project Leader
Permits Management Program

JRY:nmd

cc:

N. Dhawan, NMED HWB
J. Davis, NMED SWQB
J. Parker, NMED DOE OB
S. Yanicak, NMED DOE OB, MS J993
L. King, EPA 6PD-N
J. Vozella, DOE OLASO, MS A316
M. Kirsch, LANL RRES/ER, MS M992
D. McInroy, LANL RRES/ER, MS M992
W. Neff, LANL RRES/ER, MS M992
B. Ramsey, LANL RRES/DO, MS J591
file: Reading and HSWA LANL TA 54 (SWMU 54-007(c) and AOC 54-007(e))

State of New Mexico
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1.4.2.6.1.4.1.4

GARY E. JOHNSON
GOVERNOR

PETER MAGGIORE
SECRETARY

PAUL R. RITZMA
DEPUTY SECRETARY

Received by ER Project Office 3.29.01

01 MAR 29 PM 12: 35

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

March 28, 2001

Dr. John Browne, Director
Los Alamos National Laboratory
P. O. Box 1663, Mail Stop A100
Los Alamos, New Mexico 87545

Mr. Theodore Taylor, Project Manager
Department of Energy Los Alamos Area Office
528 35th Street, Mail Stop A316
Los Alamos, New Mexico 87544

RE: APPROVAL OF RFI REPORT FOR CONSOLIDATED PRS 73-005-99 (CONTRACTORS ROW), LOS ALAMOS NATIONAL LABORATORY
EPA ID # NM0890010515
TASK NUMBER HWB-LANL-00-013

Dear Dr. Browne and Mr. Taylor:

The Hazardous Waste Bureau (HWB) of the New Mexico Environment Department (NMED) reviewed the Los Alamos National Laboratory's (LANL) document entitled RFI Report for Consolidated PRS 73-005-99 dated July 11, 2000 and referenced by ER2000-0238. HWB reviewed and approves the RFI Report for Consolidated PRS 73-005-99 (Contractors Row) referenced by ER2000-0238, and supporting documentation submitted to HWB on February 1, 2001.

If you have any questions or concerns regarding this approval, please contact me at (505) 827-1557 extension 1036 or Vickie Maranville at (505) 827-1557 extension 1044.

Sincerely,

John Young
Corrective Action Project Leader
Permits Management Program

Request for Permit Modification
September 2002

Requested Modifications to Tables A, B, and C of Module VIII

NOTE:

The date of each request is provided next to the SWMU proposed for deletion. Strike-through text indicates deletions, and boldface text indicates new text. The number at the bottom of each technical area listing denotes the number of SWMUs on Module VIII for that area.

Requested Modifications to Table A

Technical Area 0

SWMU Number

0-001

~~0-003~~ Sept. 2002

~~0-011(a)~~ June 2001

0-011(c)

0-011(d)

~~0-011(e)~~ June 2001

~~0-012~~ Sept. 2002

0-017

0-018(a)

~~0-019~~ Sept. 2002

~~0-028(a)~~ Sept. 2002

~~0-028(b)~~ Sept. 2002

0-030(a)

0-030(b)

0-030(g)

0-030(l)

0-030(m)

~~0-033(a)~~ June 2000

0-039 ~~(16)~~ **(11)** Sept. 2002

Technical Area 1

1-001(a)

1-001(b)

1-001(c)

1-001(d)

1-001(e)

1-001(f)

1-001(g)

~~1-001(m)~~ Sept. 2002

1-001(o)

1-001(s)

1-001(t)

1-001(u)

1-002

1-003(a)

1-003(d)

1-003(e)

1-006(a)

1-006(b)

1-006(c)

1-006(d)

1-006(h)

1-006(n)

1-006(o)

1-007(a)

1-007(b)

1-007(c)

1-007(d)

1-007(e)

1-007(j)

1-007(l) ~~(30)~~ (29) June 2001

Technical Area 2

2-005

2-006(a)

2-006(b)

2-007

2-008(a)

2-009(a)

2-009(b)

2-009(c) (8) Sept. 2002

Technical Area 3

3-001(k)

3-002(c)

3-003(a)

3-003(b)

3-003(c)

3-009(a)

3-010(a)

3-012(b)

3-013(a)

3-014(a)

3-014(b)

3-014(c)

3-014(d)

3-014(e)

3-014(f)

3-014(g)

3-014(h)

3-014(i)

3-014(j)

3-014(k)

3-014(l)

3-014(m)

3-014(n)

3-014(o)

3-014(p)

3-014(q)

3-014(r)

3-014(s)

3-014(t)

3-014(u)

3-015

3-026(d)

3-028

3-033

3-036(a)

3-036(c)

3-036(d)

3-037

3-038(a)

3-038(b)

3-056(a)

3-056(c) **(42)** Sept. 2002

Technical Area 4

4-001

4-002

4-003(a)

4-003(b) (4)

Technical Area 5

5-001(a)

5-001(b)

5-002

5-003

5-004

5-005(a)

5-005(b)

5-006(b)

5-006(c)

5-006(e)

5-006(h) (11)

Technical Area 6

6-001(a)

6-001(b)

6-002

6-003(a)

6-003(c)

6-003(d)

6-003(e)

6-003(f)

6-003(h)

6-005

6-006

6-007(a)

6-007(b)

6-007(c)

6-007(d)

6-007(e)

6-007(f)

6-007(g) (18) Sept. 2002

Technical Area 7

7-001(a)

7-001(b)

7-001(c)

7-001(d) (4)

Technical Area 8

8-002

8-003(a)

8-004(a)

8-004(b)

8-004(c)

8-004(d)

~~8-005~~ June 2001

8-006(a)

8-009(a)

8-009(d)

8-009(e)

~~C-8-010~~ June 2001

~~(12)~~ (10) June 2001

Technical Area 9

9-001(a)

9-001(b)

9-001(c)

9-001(d)

9-002

9-003(a)

9-003(b)

9-003(d)

9-003(e)

9-003(g)

9-003(h)

9-003(i)

9-004(a)

9-004(b)

9-004(c)

9-004(d)

9-004(e)

9-004(f)

9-004(g)

9-004(h)

9-004(i)

9-004(j)

9-004(k)

9-004(l)

9-004(m)

9-004(n)

9-004(o)

9-005(a)

9-005(d)

9-005(g)

9-006

9-008(b)

9-009

9-013

C-9-001 (35)

Technical Area 10

10-001(a)

10-001(b)

10-001(c)

10-001(d)

10-002(a)

10-002(b)

10-003(a)

10-003(b)

10-003(c)

10-003(d)

10-003(e)

10-003(f)

10-003(g)

10-003(h)

10-003(i)

10-003(j)

10-003(k)

10-003(l)

10-003(m)

10-003(n)

10-003(o)

10-004(a)

10-004(b)

10-005

10-006

10-007 (26)

Technical Area 11

11-001(a)

11-001(b)

11-001(c)

11-002

11-004(a)

11-004(b)

11-004(c)

11-004(d)

11-004(e)

11-005(a)

11-005(b)

11-005(c)

11-006(a)

11-006(b)

11-006(c)

11-006(d)

11-009

11-011(a)

11-011(b)

11-011(d) (20)

Technical Area 12

12-001(a)

12-001(b)

Requested Modifications to Table A

12-002 (3)

Technical Area 13

13-001
13-002
13-003(a)
13-004 (4)

Technical Area 14

14-002(a)
14-002(b)
14-002(c)
14-002(d)
14-002(e)
14-002(f)
~~14-003~~ June 2001
14-005
14-006
14-007
14-009
14-010 ~~(12)~~ (11)
June 2001

Technical Area 15

15-002
15-003
15-004(a)
15-004(b)
15-004(c)
15-004(f)
15-004(g)
15-004(i)
15-006(a)
15-006(b)
15-006(c)
15-006(d)
15-007(a)
15-007(b)
15-007(c)
15-007(d)
15-008(a)
15-008(b)
15-008(c)
15-008(d)
15-009(a)
15-009(b)
15-009(c)
15-009(e)
15-009(f)
15-009(g)
15-009(h)
15-009(i)
15-009(k)
15-010(a)
15-010(b)
~~15-010(c)~~ June 2001
15-011(a)
15-011(b)
15-011(c)
15-014(a)
15-014(b)
15-014(i)
15-014(j)
15-014(k)
~~15-014(l)~~ June 2001
~~(41)~~ (39)
Sept. 2002

Technical Area 16

16-001(a)
16-001(b)
16-001(c)
16-001(d)
16-001(e)
16-003(a)
16-003(b)
16-003(c)
16-003(d)
16-003(e)
16-003(f)
16-003(g)
16-003(h)
16-003(i)
16-003(j)
16-003(k)
16-003(l)
16-003(m)
16-003(n)
16-003(o)
16-004(a)
16-004(b)
16-004(c)
16-004(d)
16-004(e)
16-004(f)
16-005(g)
16-005(n)
16-006(a)
16-006(c)
16-006(d)
16-006(e)
16-007(a)
16-008(a)
16-009(a)
16-010(a)
16-010(b) ~~Aug. 2001~~
16-010(c) ~~Aug. 2001~~
16-010(d) ~~Aug. 2001~~
16-010(e) ~~Aug. 2001~~
16-010(f) ~~Aug. 2001~~
16-010(h)
16-010(i)
16-010(j)
16-010(k)
16-010(l)
16-010(m)
16-010(n)
16-013
16-016(a)
16-016(b)
16-016(c)
16-018
16-019
16-020
16-021(a)
16-021(c)
16-026(b)
16-026(c)
16-026(d)
16-026(e)
16-026(h2)
16-026(j2)
16-026(v)
16-029(a)
16-029(b)
16-029(c)
16-029(d)
16-029(e)
16-029(f)
16-029(g)
16-030(h)
16-035
16-036 **~~(69)~~ (74)**
Sept. 2002

Technical Area 18

18-001(a)
18-001(b)
18-001(c)
18-002(a)
18-002(b)
18-003(a)
18-003(b)
18-003(c)
18-003(d)
18-003(e)
18-003(f)
18-003(g)
18-003(h)
18-004(a)
18-004(b)
18-005(a)
18-012(a)
18-012(b) (18)

Technical Area 19

19-001
19-002
19-003 (3)

Technical Area 20

20-001(a)
20-001(b)
20-001(c)
20-002(a)
20-002(b)
20-002(c)
20-002(d)
~~20-003(a)~~ June2001
20-005 ~~(9)~~ (8)
June 2001

Technical Area 21

21-002(a)
21-003
21-004(b)
21-004(c)
21-006(a)
21-006(b)
21-006(c)
21-006(d)
21-006(e)
21-007
21-010(a)
21-010(b)
21-010(c)
21-010(d)
21-010(e)
21-010(f)
21-010(g)
21-010(h)
21-011(a)
21-011(b)
21-011(c)
21-011(d)
21-011(e)
21-011(f)
21-011(g)
21-011(i)
21-011(j)
21-011(k)
21-012(b)
21-013(a)
21-013(b)
21-013(c)
21-013(d)
21-013(e)
21-014
21-015
21-016(a)
21-016(b)
21-016(c)
21-017(a)
21-017(b)
21-017(c)
21-018(a)
21-018(b)
21-021
21-022(a)
21-022(b)
21-022(c)
21-022(d)
21-022(e)
21-022(f)
21-022(g)
21-022(h)
21-022(i)
21-022(j)
21-023(a)
21-023(b)
21-023(c)
21-023(d)
21-024(a)
21-024(b)
21-024(c)
21-024(d)
21-024(e)
21-024(f)
21-024(g)
21-024(h)
21-024(i)
21-024(j)
21-024(k)
21-024(l)
21-024(n)
21-024(o)
21-026(a)
21-026(b)
21-027(a)
21-027(c)
21-027(d)
~~21-029~~ Sept. 2002
~~(79)~~ **(78)**
Sept. 2002

Requested Modifications to Table A

Technical Area 22

22-010(a)
22-010(b)
22-011
22-012
22-014(a)
22-014(b)
22-015(a)
22-015(b)
22-015(c)
22-015(d)
22-015(e)
22-016 (12)

Technical Area 26

26-001
26-002(a)
26-002(b)
26-003 (4)

Technical Area 27

27-002
27-003 (2)

Technical Area 31

31-001 (1)

Technical Area 32

32-001
32-002(a)
32-002(b) (3)

Technical Area 33

33-001(a)
33-001(b)
33-001(c)
33-001(d)
33-001(e)
33-002(a)
33-002(b)
33-002(c)
33-002(d)
33-002(e)
33-003(a)
33-003(b)
33-004(a)
33-004(b)
33-004(c)
33-004(d)
33-004(g)
33-004(h)
33-004(i)
33-004(j)
33-004(k)
33-004(m)
33-005(a)
33-005(b)
33-005(c)
33-006(a)
33-006(b)
33-007(a)
33-007(b)
33-007(c)
33-008(a)
33-008(b)
33-009
33-010(a)
33-010(b)
33-010(c)
33-010(d)
33-010(f)
33-010(g)
33-010(h)
33-011(a)
33-011(c)
33-011(d)
33-011(e)
33-012(a)
33-013
33-014
33-015
33-016
33-017 (50)

Technical Area 35

35-002
35-003(a)
35-003(b)
35-003(c)
35-003(d)
35-003(e)
35-003(f)
35-003(g)
35-003(h)
35-003(j)
35-003(k)
35-003(l)
35-003(m)
35-003(n)
35-003(o)
35-003(p)
35-003(q)
35-004(a)
35-004(b)
35-004(g)
35-004(h)
35-008
35-009(a)
35-009(b)
35-009(c)
35-009(d)
35-009(e)
35-010(a)
35-010(b)
35-010(c)
35-010(d)
35-013(a)
35-013(b)
35-013(c)
35-014(a)
35-014(b)
35-014(e)
35-014(g)
35-015(a)
35-015(b)
35-016(a)
35-016(c)
35-016(d)
35-016(i)
35-016(k)
35-016(m)
35-016(o)
35-016(p)
35-016(q) (49)

Technical Area 36

36-001
36-002
36-003(a)
36-003(b)
36-004(d)
36-005
36-006
C-36-003 (8)

Technical Area 39

39-001(a)
39-001(b)
39-002(a)
39-004(a)
39-004(b)
39-004(c) ~~Aug. 2001~~
39-004(d) ~~Aug. 2001~~
39-004(e)
39-005
39-006(a)
39-007(a)
39-008 ~~(10)~~ **(12)** Sept. 2002

Technical Area 40

40-001(b)
40-001(c)
40-003(a) ~~June 2000~~
40-004
40-005
40-006(a)
40-006(b)
40-006(c)
40-009
40-010 ~~(9)~~ **(10)** Sept. 2002

Technical Area 41

41-001
41-002(a)
41-002(b)
41-002(c) (4)

Technical Area 42

42-001(a)
42-001(b)
42-001(c)
42-002(b)
42-003 (5)

Technical Area 43

43-001(a)
43-002 (2)

Technical Area 45

45-001
45-002
45-003
45-003 (4)

Technical Area 46

46-002
46-003(a)
46-003(b)
46-003(c)
46-003(d)
46-003(e)
46-003(f)
46-003(g)
46-003(h)
46-004(a)
46-004(b)
46-004(c)
46-004(d)
46-004(e)
46-004(f)
46-004(g)
46-004(h)
46-004(a2)
46-004(b2)
46-004(c2)
46-004(d2)
46-004(m)
46-004(p)
46-004(q)
46-004(r)
46-004(s)
46-004(t)
46-004(u)
46-004(v)
46-004(w)
46-004(x)
46-004(y)
46-004(z)
46-005
46-006(a)
46-006(b)
46-006(c)
46-006(d)
46-006(f)
46-006(g)
46-007
46-008(a)
46-008(b)
46-008(d)
46-008(e)
46-008(f)
46-008(g)
46-009(a)
46-009(b)
46-010(d) (50)

Technical Area 48

48-002(a)
48-002(b)
48-003
48-004(a)
48-004(b)
48-004(c)
48-005
48-007(a)
48-007(b)
48-007(c)
48-007(d)
48-007(f)
48-010 (13)

Technical Area 49

49-001(a)
49-001(b)

Requested Modifications to Table A

49-001(c)
49-001(d)
49-001(e)
49-001(f)
49-001(g)
49-003
49-004
49-005(a)
49-006 (11)

Technical Area 50

50-001(a) ~~Aug. 2001~~
50-002(a)
50-002(b)
50-002(c)
50-004(a)
50-004(b)
50-004(c)
50-006(a)
50-006(c)
50-006(d)
50-009
50-011(a) ~~(11)~~ **(12)** Sept. 2002

Technical Area 52

52-001(d)
52-002(a) (2)

Technical Area 53

53-001(a)
53-001(b)
53-002(a)
53-002(b)
53-005
53-006(b)
53-006(c)
53-006(d)
53-006(e)
53-006(f)
53-007(a) (11)

Technical Area 54

54-001(a)
54-004 (excluding Shaft No. 9)
54-005
54-006
54-007(a)
~~54-007(c)~~ Sept. 2002
54-012(b)
54-013(b)
54-014(b)
54-014(c)
54-014(d)
54-015(k)
54-017
54-018
54-019
54-020 ~~(16)~~ **(15)** Sept. 2002

Technical Area 55

55-008 ~~(2)~~ **(1)** Sept. 2002

Technical Area 60

60-002
60-005(a)
60-006(a)
60-007(a)
60-007(b) (5)

Technical Area 61

61-002
61-005
61-006
61-007 (4)

Technical Area 63

63-001(a)
63-001(b) (2)

Technical Area 69

69-001 (1)

Technical Area 73

73-001(a)
73-001(b)
73-001(c)
73-001(d)
73-002
73-004(a)
73-004(b)
73-004(c)
73-004(d)
~~73-005)~~ Sept. 2002
73-006 ~~(11)~~**(10)** Sept. 2002

Total SWMUs in Table A =~~760~~ **759**

Table A.1
No Further Action SWMUs Removed from Table A
Through a Class III Permit Modification and Date of Removal

0-003									
0-005	12-23-98	3-012(a)	12-23-98	14-004(b)	12-23-98	16-012(q)	12-23-98	40-001(a)	12-23-98
0-011(a)		3-018	12-23-98	15-009(j)	**11-09-01**	16-012(r)	12-23-98	46-008(c)	12-23-98
0-011(e)		3-020(a)	12-23-98	15-010(e)		16-012(s)	12-23-98	52-001(a)	12-23-98
0-012		3-035(a)	12-23-98	15-012(a)	**11-09-01**	16-012(t)	12-23-98	52-001(b)	12-23-98
0-016	**11-09-01**	3-035(b)	12-23-98	15-012(b)	**11-09-01**	16-012(u)	12-23-98	52-001(c)	12-23-98
0-019		3-039(a)	12-23-98	15-014(l)		16-012(v)	12-23-98	52-002(b)	12-23-98
0-028(a)		3-043(e)	05-02-01	15-014(m)	12-23-98	16-012(w)	12-23-98	52-002(c)	12-23-98
0-028(b)		3-044(a)	05-02-01	16-005(i)	12-23-98	16-012(x)	12-23-98	52-002(d)	12-23-98
0-033(a)		6-003(g)	**11-09-01**	16-005(o)	12-23-98	16-012(y)	12-23-98	52-002(e)	12-8-97
1-001(h)	12-23-98	7-003(c)	12-23-98	16-006(b)	12-23-98	16-012(z)	12-23-98	52-002(f)	12-23-98
1-001(i)	12-23-98	7-003(d)	12-23-98	16-006(f)	12-23-98	18-007	05-02-01	53-007(b)	12-23-98
1-001(j)	12-23-98	8-003(b)	12-23-98	16-010(g)	12-23-98	20-003(a)		54-001(c)	12-23-98
1-001(k)	12-23-98	8-003(c)	12-23-98	16-012(a)	12-23-98	21-005	**11-09-01**	54-007(b)	05-02-01
1-001(l)	12-23-98	8-005		16-012(b)	12-23-98	21-012(a)	12-23-98	**54-007(c)**	
1-001(m)		8-006(b)	12-23-98	16-012(c)	12-23-98	21-024(m)	12-23-98	54-013(a)	12-23-98
1-001(n)	12-23-98	C-8-010		16-012(d)	12-23-98	21-027(b)	12-23-98	54-015(h)	05-02-01
2-008(b)	**11-09-01**	8-007	12-23-98	16-012(e)	12-23-98	**21-029**		55-009	**09-04-02**
3-001(a)	12-23-98	9-003(c)	12-23-98	16-012(f)	12-23-98	27-001	05-02-01	59-001	05-02-01
3-001(b)	12-23-98	9-003(f)	12-23-98	16-012(g)	12-23-98	33-004(e)	12-23-98	61-004(a)	05-02-01
3-001(c)	12-23-98	9-005(b)	12-23-98	16-012(h)	12-23-98	33-004(f)	12-23-98	**73-005**	
3-002(b)	12-23-98	9-005(c)	12-23-98	16-012(i)	12-23-98	35-003(i)	12-23-98		
3-009(b)	12-23-98	9-005(e)	12-23-98	16-012(j)	12-23-98	35-004(e)	05-02-01		
3-009(c)	05-02-01	9-005(f)	12-23-98	16-012(k)	12-23-98	35-006	05-02-01		
3-009(d)	**09-04-02**	9-005(h)	12-23-98	16-012(l)	12-23-98	35-011(a)	05-02-01		
3-009(e)	12-23-98	9-007	12-23-98	16-012(m)	12-23-98	35-013(d)	05-02-01		
3-009(f)	12-23-98	11-011(c)	05-02-01	16-012(n)	12-23-98	36-003(c)	12-23-98		
3-009(g)	05-02-01	11-007	12-23-98	16-012(o)	12-23-98	39-003	12-23-98		
3-009(h)	12-23-98	14-003		16-012(p)	12-23-98	39-006(b)	12-23-98		

SWMUs removed from Table A = ~~132~~ **133**

Requested Modifications to Table B Priority SWMUs*

SWMU Number	11-004(d)	16-007	21-011(g)	35-010(d)
1-001(a)	11-004(e)	16-008(b)	21-011(h)	36-003(a)
1-001(b)	11-005(a)	16-016	21-011(i)	36-003(b)
1-001(c)	11-005(b)	16-018	21-014	39-001(a)
1-001(d)	11-006(a)	16-019	21-015	39-001(b)
1-001(e)	13-004	16-020	21-016(a)	41-001
1-001(f)	15-002	16-021(a)	21-017(a)	46-002
1-001(g)	15-006(a)	18-001(a)	21-017(b)	46-006(a)
~~1-001(m)~~	15-006(b)	18-003(a)	21-017(c)	46-006(b)
1-002	15-006(c)	18-003(b)	21-018(a)	46-006(c)
1-003(a)	15-006(d)	18-003(c)	21-018(b)	46-006(d)
2-005	15-007(a)	18-003(d)	22-015(c)	46-007
2-008(a)	15-007(b)	18-003(e)	33-002(a)	49-001(a)
3-010(a)	15-007(c)	18-003(f)	33-002(b)	50-006(a)
3-012(b)	15-007(d)	18-003(g)	33-002(c)	50-006(c)
3-013(a)	15-008(a)	18-003(h)	33-017	50-006(d)
3-015	15-008(b)	21-006(a)	35-003(a)	50-009
3-029(a)	15-008(c)	21-006(b)	35-003(b)	54-004 (excluding Shaft No. 9)
5-005(a)	15-008(d)	21-006(c)	35-003(c)	
6-007(a)	15-009(a)	21-006(d)	35-003(d)	54-005
8-003(a)	15-009(b)	21-006(e)	35-003(e)	60-005(a)
9-008(a)	15-012(c)	21-010(a)	35-003(f)	73-001(a)
9-008(b)	15-012(d)	21-010(b)	35-003(g)	
9-009	15-012(e)	21-010(c)	35-003(h)	
9-013	15-012(f)	21-010(d)	35-003(j)	
10-003(a)	15-012(g)	21-010(e)	35-003(k)	
10-003(b)	16-001(b)	21-010(f)	35-003(l)	
10-003(c)	16-001(c)	21-010(g)	35-003(m)	
10-003(d)	16-001(d)	21-010(h)	35-003(n)	
10-003(e)	16-001(e)	21-011(a)	35-003(o)	
10-003(f)	16-005(n)	21-011(b)	35-003(p)	
10-006	16-006(a)	21-011(c)	35-003(q)	
11-004(a)	16-006(c)	21-011(d)	35-010(a)	
11-004(b)	16-006(d)	21-011(e)	35-010(b)	
11-004(c)	16-006(e)	21-011(f)	35-010(c)	

Total SWMUs in Table B = ~~160~~ **159**

* As RFI work progresses, EPA may identify more SWMUs to be added to the list to be addressed in the installation work plans.

Table B.1
No Further Action SWMUs Removed from Table B Through a Class III Permit Modification and Date of Removal

0-005	12-23-98	1-001(l)	12-23-98	8-003(b)	12-23-98	16-005(o)	12-23-98	36-003(c)	12-23-98
1-001(h)	12-23-98	**1-001(m)**		8-003(c)	12-23-98	16-006(f)	12-23-98	54-015(h)	05-02-01
1-001(i)	12-23-98	1-001(n)	12-23-98	8-007	12-23-98	21-012(a)	12-23-98		
1-001(j)	12-23-98	3-012(a)	12-23-98	15-012(a)	**11-09-01**	35-003(i)	12-23-98		
1-001(k)	12-23-98	3-020(a)	12-23-98	15-012(b)	**11-09-01**	35-006	05-02-01		

SWMUs removed from Table B = ~~21~~ **22**

Requested Modifications to Table C

RFI Work Plan due July 7, 1994: Technical Area 16

16-005(a)
16-005(c)
16-005(d)
16-005(e)
16-005(h)
16-005(j)
16-005(k)
16-005(l)
16-005(m)
16-006(g)
16-006(h)
16-015(a)
16-015(b)
16-017
16-024(e)
16-025(a)
16-025(b)
16-025(b2)
16-025(c2)
16-025(d)
16-025(e)
16-025(f)
16-025(g)
16-025(h)
16-025(i)
16-025(j)
16-025(k)
16-025(l)
16-025(m)
16-025(n)
16-025(o)
16-025(p)
16-025(q)
16-025(r)
16-025(s)
16-025(t)
16-025(u)
16-025(v)
16-025(w)
16-025(x)
16-025(y)
16-025(z)
16-026(m)
16-026(n)
16-026(o)
16-026(p)
16-026(q)
16-026(s)
16-026(w)
16-028(a)
16-029(a2)
16-029(b2)
16-029(c2)
16-029(d2)
16-029(e2)
16-029(f2)
16-029(g2)
16-029(h2)
16-029(k)
16-029(l)
16-029(m)
16-029(n)
16-029(o)
16-029(p)
16-029(q)
16-029(r)
16-029(s)
16-029(t)
16-029(u)
16-029(v)
16-029(w)
16-029(x)
16-029(y)
16-029(z)
16-031(c)
16-031(d)
16-032(a)
16-032(c)
16-034(a)
16-034(b)
16-034(c)
16-034(d)
16-034(e)
16-034(f)
16-034(l)
16-034(m)
16-034(n)
16-034(o)
16-034(p)
C-16-025
C-16-026
Total SWMUs = 91*

RFI Work Plan due July 7, 1995: Technical Area 16

16-016(d)
16-016(e)
16-016(g)
16-025(a2)
16-025(d2)
~~16-025(e2)~~ June 2001
~~16-025(f2)~~ June 2001
~~16-025(h2)~~ June 2001
16-026(a)
~~16-026(a2)~~ June 2001
16-026(b2)
16-026(c2)
~~16-026(d2)~~ June 2001
~~16-026(e2)~~ June 2001
16-026(f)
~~16-026(f2)~~ June 2001
16-026(g)
~~16-026(g2)~~ June 2001
~~16-026(h)~~ June 2001
16-026(i)
16-026(j)
~~16-026(k)~~ June 2001
16-026(k2)
16-026(l)
16-026(r)
~~16-026(t)~~ June 2001
16-026(u)
~~16-026(x)~~ June 2001
16-026(y)
16-026(z)
16-028(b)
16-028(c)
16-028(d)
16-028(e)
16-029(h)
16-029(i)
16-029(j)
16-030(a)
~~16-030(b)~~ June 2001
16-030(c)
~~16-030(e)~~ June 2001
~~16-030(f)~~ June 2001
16-031(a)
16-031(b)
16-031(e)
16-031(f)
16-031(h)
16-034(h)
16-034(i)
16-034(j)
16-034(k)
Total SWMUs = ~~51~~ 36

RFI Work Plan due May 21, 1995: Operable Unit 1114

3-009(i)
3-009(j)
3-011
3-021
3-025(b)
3-026(c)
3-029
3-031
3-034(a)
3-034(b)
3-043(c)
3-045(a)
3-045(b)
3-045(c)
3-045(e)
3-045(f)
3-045(g)
3-045(h)
~~3-046~~ **Sept. 2002**
3-049(a)
3-049(b)
3-049(e)
3-050(a)
3-050(d)
3-050(f)
3-050(g)
3-052(a)
3-052(e)
3-052(f)
3-054(a)
3-054(b)
3-054(c)
3-054(d)
3-054(e)
3-055(a)
3-055(c)
3-056(d)
3-056(l)
3-059
Total SWMUs = ~~39~~ 38

* 20 additional SWMUs were added after work plan review

Table C.1
No Further Action SWMUs Removed from Table C
Through a Class III Permit Modification and Date of Removal

3-002(a)	05-02-01	**3-046**		16-006(i)	12-23-98	16-026(g2)		16-032(d)	12-23-98
3-002(d)	05-02-01	3-049(c)	05-02-01	16-025(c)	12-23-98	16-026(h)		16-032(e)	12-23-98
3-009(c)	05-02-01	3-049(d)	05-02-01	16-025(e2)		16-026(i2)	12-23-98	16-034(g)	12-23-98
3-019	05-02-01	3-050(e)	05-02-01	16-025(f2)		16-026(k)			
3-024	12-8-97	3-052(c)	05-02-01	16-025(g2)	12-23-98	16-026(t)		SWMUs removed from	
3-025(a)	05-02-01	3-055(d)	05-02-01	16-025(h2)		16-026(x)		Table C = ~~27~~ 43	
3-026(b)	05-02-01	3-056(m)	05-02-01	16-026(a)		16-030(b)			
3-032	05-02-01	3-056(n)	05-02-01	16-026(d2)		16-030(e)			
3-045(d)	12-8-97	16-005(b)	05-02-01	16-026(e2)		16-030(f)			
3-045(i)	05-02-01	16-005(f)	12-23-98	16-026(f2)		16-031(g)	12-23-98		

Request for Permit Modification
September 2002

Proposed Tables A, B, and C of Module VIII

NOTE:

The number at the bottom of each technical area listing denotes the number of SWMUs on Module VIII for that area.

Proposed Table A

Technical Area 0

SWMU Number

0-001
0-011(c)
0-011(d)
0-017
0-018(a)
0-030(a)
0-030(b)
0-030(g)
0-030(l)
0-030(m)
0-039 (11)

Technical Area 1

1-001(a)
1-001(b)
1-001(c)
1-001(d)
1-001(e)
1-001(f)
1-001(g)
1-001(o)
1-001(s)
1-001(t)
1-001(u)
1-002
1-003(a)
1-003(d)
1-003(e)
1-006(a)
1-006(b)
1-006(c)
1-006(d)
1-006(h)
1-006(n)
1-006(o)
1-007(a)
1-007(b)
1-007(c)
1-007(d)
1-007(e)
1-007(j)
1-007(l) (29)

Technical Area 2

2-005
2-006(a)
2-006(b)
2-007
2-008(a)
2-009(a)
2-009(b)
2-009(c) (8)

Technical Area 3

3-001(k)
3-002(c)
3-003(a)
3-003(b)
3-003(c)
3-009(a)
3-010(a)
3-012(b)
3-013(a)
3-014(a)
3-014(b)
3-014(c)
3-014(d)
3-014(e)
3-014(f)
3-014(g)
3-014(h)
3-014(i)
3-014(j)
3-014(k)
3-014(l)
3-014(m)
3-014(n)
3-014(o)
3-014(p)
3-014(q)
3-014(r)
3-014(s)
3-014(t)
3-014(u)
3-015
3-026(d)
3-028
3-033
3-036(a)
3-036(c)
3-036(d)
3-037
3-038(a)
3-038(b)
3-056(a)
3-056(c) (42)

Technical Area 4

4-001
4-002
4-003(a)
4-003(b) (4)

Technical Area 5

5-001(a)
5-001(b)
5-002
5-003
5-004
5-005(a)
5-005(b)
5-006(b)
5-006(c)
5-006(e)
5-006(h) (11)

Technical Area 6

6-001(a)
6-001(b)
6-002
6-003(a)
6-003(c)
6-003(d)
6-003(e)
6-003(f)
6-003(h)
6-005
6-006
6-007(a)
6-007(b)
6-007(c)
6-007(d)
6-007(e)
6-007(f)
6-007(g) (18)

Technical Area 7

7-001(a)
7-001(b)
7-001(c)
7-001(d) (4)

Technical Area 8

8-002
8-003(a)
8-004(a)
8-004(b)
8-004(c)
8-004(d)
8-006(a)
8-009(a)
8-009(d)
8-009(e) (10)

Technical Area 9

9-001(a)
9-001(b)
9-001(c)
9-001(d)
9-002
9-003(a)
9-003(b)
9-003(d)
9-003(e)
9-003(g)
9-003(h)
9-003(i)
9-004(a)
9-004(b)
9-004(c)
9-004(d)
9-004(e)
9-004(f)
9-004(g)
9-004(h)
9-004(i)
9-004(j)
9-004(k)
9-004(l)
9-004(m)
9-004(n)
9-004(o)
9-005(a)
9-005(d)
9-005(g)
9-006
9-008(b)
9-009
9-013
C-9-001 (35)

Technical Area 10

10-001(a)
10-001(b)
10-001(c)
10-001(d)
10-002(a)
10-002(b)
10-003(a)
10-003(b)
10-003(c)
10-003(d)
10-003(e)
10-003(f)
10-003(g)
10-003(h)
10-003(i)
10-003(j)
10-003(k)
10-003(l)
10-003(m)
10-003(n)
10-003(o)
10-004(a)
10-004(b)
10-005
10-006
10-007 (26)

Technical Area 11

11-001(a)
11-001(b)
11-001(c)
11-002
11-004(a)
11-004(b)
11-004(c)
11-004(d)
11-004(e)
11-005(a)
11-005(b)
11-005(c)
11-006(a)
11-006(b)
11-006(c)
11-006(d)
11-009
11-011(a)
11-011(b)
11-011(d) (20)

Technical Area 12

12-001(a)
12-001(b)
12-002 (3)

Technical Area 13

13-001
13-002
13-003(a)
13-004 (4)

Technical Area 14

14-002(a)
14-002(b)
14-002(c)
14-002(d)
14-002(e)
14-002(f)

Proposed Table A

14-005
14-006
14-007
14-009
14-010 (11)

Technical Area 15

15-002
15-003
15-004(a)
15-004(b)
15-004(c)
15-004(f)
15-004(g)
15-004(i)
15-006(a)
15-006(b)
15-006(c)
15-006(d)
15-007(a)
15-007(b)
15-007(c)
15-007(d)
15-008(a)
15-008(b)
15-008(c)
15-008(d)
15-009(a)
15-009(b)
15-009(c)
15-009(e)
15-009(f)
15-009(g)
15-009(h)
15-009(i)
15-009(k)
15-010(a)
15-010(b)
15-011(a)
15-011(b)
15-011(c)
15-014(a)
15-014(b)
15-014(i)
15-014(j)
15-014(k) (39)

Technical Area 16

16-001(a)
16-001(b)
16-001(c)
16-001(d)
16-001(e)
16-003(a)
16-003(b)
16-003(c)
16-003(d)
16-003(e)
16-003(f)
16-003(g)
16-003(h)
16-003(i)
16-003(j)
16-003(k)
16-003(l)
16-003(m)
16-003(n)
16-003(o)
16-004(a)
16-004(b)
16-004(c)
16-004(d)
16-004(e)
16-004(f)
16-005(g)
16-005(n)
16-006(a)
16-006(c)
16-006(d)
16-006(e)
16-007(a)
16-008(a)
16-009(a)
16-010(a)
16-010(b)
16-010(c)
16-010(d)
16-010(e)
16-010(f)
16-010(h)
16-010(i)
16-010(j)
16-010(k)
16-010(l)
16-010(m)
16-010(n)
16-013
16-016(a)
16-016(b)
16-016(c)
16-018
16-019
16-020
16-021(a)
16-021(c)
16-026(b)
16-026(c)
16-026(d)
16-026(e)
16-026(h2)
16-026(j2)
16-026(v)
16-029(a)
16-029(b)
16-029(c)
16-029(d)
16-029(e)
16-029(f)
16-029(g)
16-030(h)
16-035
16-036 (74)

Technical Area 18

18-001(a)
18-001(b)
18-001(c)
18-002(a)
18-002(b)
18-003(a)
18-003(b)
18-003(c)
18-003(d)
18-003(e)
18-003(f)
18-003(g)
18-003(h)
18-004(a)
18-004(b)
18-005(a)
18-012(a)
18-012(b) (18)

Technical Area 19

19-001
19-002
19-003 (3)

Technical Area 20

20-001(a)
20-001(b)
20-001(c)
20-002(a)
20-002(b)
20-002(c)
20-002(d)

Technical Area 21

21-002(a)
21-003
21-004(b)
21-004(c)
21-006(a)
21-006(b)
21-006(c)
21-006(d)
21-006(e)
21-007
21-010(a)
21-010(b)
21-010(c)
21-010(d)
21-010(e)
21-010(f)
21-010(g)
21-010(h)
21-011(a)
21-011(b)
21-011(c)
21-011(d)
21-011(e)
21-011(f)
21-011(g)
21-011(i)
21-011(j)
21-011(k)
21-012(b)
21-013(a)
21-013(b)
21-013(c)
21-013(d)
21-013(e)
21-014
21-015
21-016(a)
21-016(b)
21-016(c)
21-017(a)
21-017(b)
21-017(c)
21-018(a)
21-018(b)
21-021
21-022(a)
21-022(b)
21-022(c)
21-022(d)
21-022(e)
21-022(f)
21-022(g)
21-022(h)
21-022(i)
21-022(j)
21-023(a)
21-023(b)
21-023(c)
21-023(d)
21-024(a)
21-024(b)
21-024(c)
21-024(d)
21-024(e)
21-024(f)
21-024(g)
21-024(h)
21-024(i)
21-024(j)
21-024(k)
21-024(l)
21-024(n)
21-024(o)
21-026(a)
21-026(b)
21-027(a)
21-027(c)
21-027(d) (78)

Technical Area 22

22-010(a)
22-010(b)
22-011
22-012
22-014(a)
22-014(b)
22-015(a)
22-015(b)
22-015(c)
22-015(d)
22-015(e)
22-016 (12)

Technical Area 26

26-001
26-002(a)
26-002(b)
26-003 (4)

Technical Area 27

27-002
27-003 (2)

Proposed Table A

Technical Area 31

- 31-001 (1)

Technical Area 32

- 32-001
- 32-002(a)
- 32-002(b) (3)

Technical Area 33

- 33-001(a)
- 33-001(b)
- 33-001(c)
- 33-001(d)
- 33-001(e)
- 33-002(a)
- 33-002(b)
- 33-002(c)
- 33-002(d)
- 33-002(e)
- 33-003(a)
- 33-003(b)
- 33-004(a)
- 33-004(b)
- 33-004(c)
- 33-004(d)
- 33-004(g)
- 33-004(h)
- 33-004(i)
- 33-004(j)
- 33-004(k)
- 33-004(m)
- 33-005(a)
- 33-005(b)
- 33-005(c)
- 33-006(a)
- 33-006(b)
- 33-007(a)
- 33-007(b)
- 33-007(c)
- 33-008(a)
- 33-008(b)
- 33-009
- 33-010(a)
- 33-010(b)
- 33-010(c)
- 33-010(d)
- 33-010(f)
- 33-010(g)
- 33-010(h)
- 33-011(a)
- 33-011(c)
- 33-011(d)
- 33-011(e)
- 33-012(a)
- 33-013
- 33-014
- 33-015
- 33-016
- 33-017 (50)

Technical Area 35

- 35-002
- 35-003(a)
- 35-003(b)
- 35-003(c)
- 35-003(d)
- 35-003(e)
- 35-003(f)
- 35-003(g)
- 35-003(h)
- 35-003(j)
- 35-003(k)
- 35-003(l)
- 35-003(m)
- 35-003(n)
- 35-003(o)
- 35-003(p)
- 35-003(q)
- 35-004(a)
- 35-004(b)
- 35-004(g)
- 35-004(h)
- 35-008
- 35-009(a)
- 35-009(b)
- 35-009(c)
- 35-009(d)
- 35-009(e)
- 35-010(a)
- 35-010(b)
- 35-010(c)
- 35-010(d)
- 35-013(a)
- 35-013(b)
- 35-013(c)
- 35-014(a)
- 35-014(b)
- 35-014(e)
- 35-014(g)
- 35-015(a)
- 35-015(b)
- 35-016(a)
- 35-016(c)
- 35-016(d)
- 35-016(i)
- 35-016(k)
- 35-016(m)
- 35-016(o)
- 35-016(p)
- 35-016(q) (49)

Technical Area 36

- 36-001
- 36-002
- 36-003(a)
- 36-003(b)
- 36-004(d)
- 36-005
- 36-006
- C-36-003 (8)

Technical Area 39

- 39-001(a)
- 39-001(b)
- 39-002(a)
- 39-004(a)
- 39-004(b)
- 39-004(c)
- 39-004(d)
- 39-004(e)
- 39-005
- 39-006(a)
- 39-007(a)
- 39-008 (12)

Technical Area 40

- 40-001(b)
- 40-001(c)
- 40-003(a)
- 40-004
- 40-005
- 40-006(a)
- 40-006(b)
- 40-006(c)
- 40-009
- 40-010 (10)

Technical Area 41

- 41-001
- 41-002(a)
- 41-002(b)
- 41-002(c) (4)

Technical Area 42

- 42-001(a)
- 42-001(b)
- 42-001(c)
- 42-002(b)
- 42-003 (5)

Technical Area 43

- 43-001(a)
- 43-002 (2)

Technical Area 45

- 45-001
- 45-002
- 45-003
- 45-003 (4)

Technical Area 46

- 46-002
- 46-003(a)
- 46-003(b)
- 46-003(c)
- 46-003(d)
- 46-003(e)
- 46-003(f)
- 46-003(g)
- 46-003(h)
- 46-004(a)
- 46-004(b)
- 46-004(c)
- 46-004(d)
- 46-004(e)
- 46-004(f)
- 46-004(g)
- 46-004(h)
- 46-004(a2)
- 46-004(b2)
- 46-004(c2)
- 46-004(d2)
- 46-004(m)
- 46-004(p)
- 46-004(q)
- 46-004(r)
- 46-004(s)
- 46-004(t)
- 46-004(u)
- 46-004(v)
- 46-004(w)
- 46-004(x)
- 46-004(y)
- 46-004(z)
- 46-005
- 46-006(a)
- 46-006(b)
- 46-006(c)
- 46-006(d)
- 46-006(f)
- 46-006(g)
- 46-007
- 46-008(a)
- 46-008(b)
- 46-008(d)
- 46-008(e)
- 46-008(f)
- 46-008(g)
- 46-009(a)
- 46-009(b)
- 46-010(d) (50)

Technical Area 48

- 48-002(a)
- 48-002(b)
- 48-003
- 48-004(a)
- 48-004(b)
- 48-004(c)
- 48-005
- 48-007(a)
- 48-007(b)
- 48-007(c)
- 48-007(d)
- 48-007(f)
- 48-010 (13)

Technical Area 49

- 49-001(a)
- 49-001(b)
- 49-001(c)
- 49-001(d)
- 49-001(e)
- 49-001(f)
- 49-001(g)
- 49-003
- 49-004
- 49-005(a)
- 49-006 (11)

Technical Area 50

- 50-001(a)
- 50-002(a)
- 50-002(b)
- 50-002(c)
- 50-004(a)
- 50-004(b)
- 50-004(c)
- 50-006(a)
- 50-006(c)
- 50-006(d)
- 50-009
- 50-011(a) (12)

Technical Area 52

- 52-001(d)

Proposed Table A

52-002(a) (2)

Technical Area 53

53-001(a)
53-001(b)
53-002(a)
53-002(b)
53-005
53-006(b)
53-006(c)
53-006(d)
53-006(e)
53-006(f)
53-007(a) (11)

Technical Area 54

54-001(a)
54-004 (excluding Shaft No. 9)
54-005
54-006
54-007(a)
54-012(b)
54-013(b)
54-014(b)
54-014(c)
54-014(d)
54-015(k)
54-017
54-018
54-019
54-020 (15)

Technical Area 55

55-008 (1)

Technical Area 60

60-002
60-005(a)
60-006(a)
60-007(a)
60-007(b) (5)

Technical Area 61

61-002
61-005
61-006
61-007 (4)

Technical Area 63

63-001(a)
63-001(b) (2)

Technical Area 69

69-001 (1)

Technical Area 73

73-001(a)
73-001(b)
73-001(c)
73-001(d)
73-002
73-004(a)
73-004(b)
73-004(c)
73-004(d)
73-006 (10)

Total SWMUs
in Table A = 759

Proposed Table A.1
No Further Action SWMUs Removed from Table A
Through a Class III Permit Modification and Date of Removal

0-003		3-009(h)	12-23-98	14-003		16-012(p)	12-23-98	39-006(b)	12-23-98
0-005	12-23-98	3-012(a)	12-23-98	14-004(b)	12-23-98	16-012(q)	12-23-98	40-001(a)	12-23-98
0-011(a)		3-018	12-23-98	15-009(j)	11-09-01	16-012(r)	12-23-98	46-008(c)	12-23-98
0-011(e)		3-020(a)	12-23-98	15-010(e)		16-012(s)	12-23-98	52-001(a)	12-23-98
0-012		3-035(a)	12-23-98	15-012(a)	11-09-01	16-012(t)	12-23-98	52-001(b)	12-23-98
0-016	11-09-01	3-035(b)	12-23-98	15-012(b)	11-09-01	16-012(u)	12-23-98	52-001(c)	12-23-98
0-019		3-039(a)	12-23-98	15-014(l)		16-012(v)	12-23-98	52-002(b)	12-23-98
0-028(a)		3-043(e)	05-02-01	15-014(m)	12-23-98	16-012(w)	12-23-98	52-002(c)	12-23-98
0-028(b)		3-044(a)	05-02-01	16-005(i)	12-23-98	16-012(x)	12-23-98	52-002(d)	12-23-98
0-033(a)		6-003(g)	11-09-01	16-005(o)	12-23-98	16-012(y)	12-23-98	52-002(e)	12-8-97
1-001(h)	12-23-98	7-003(c)	12-23-98	16-006(b)	12-23-98	16-012(z)	12-23-98	52-002(f)	12-23-98
1-001(i)	12-23-98	7-003(d)	12-23-98	16-006(f)	12-23-98	18-007	05-02-01	53-007(b)	12-23-98
1-001(j)	12-23-98	8-003(b)	12-23-98	16-010(g)	12-23-98	20-003(a)		54-001(c)	12-23-98
1-001(k)	12-23-98	8-003(c)	12-23-98	16-012(a)	12-23-98	21-005	11-09-01	54-007(b)	05-02-01
1-001(l)	12-23-98	8-005		16-012(b)	12-23-98	21-012(a)	12-23-98	54-007(c)	
1-001(m)		8-006(b)	12-23-98	16-012(c)	12-23-98	21-024(m)	12-23-98	54-013(a)	12-23-98
1-001(n)	12-23-98	C-8-010		16-012(d)	12-23-98	21-027(b)	12-23-98	54-015(h)	05-02-01
2-008(b)	11-09-01	8-007	12-23-98	16-012(e)	12-23-98	21-029		55-009	09-04-02
3-001(a)	12-23-98	9-003(c)	12-23-98	16-012(f)	12-23-98	27-001	05-02-01	59-001	05-02-01
3-001(b)	12-23-98	9-003(f)	12-23-98	16-012(g)	12-23-98	33-004(e)	12-23-98	61-004(a)	05-02-01
3-001(c)	12-23-98	9-005(b)	12-23-98	16-012(h)	12-23-98	33-004(f)	12-23-98	73-005	
3-002(b)	12-23-98	9-005(c)	12-23-98	16-012(i)	12-23-98	35-003(i)	12-23-98		
3-009(b)	12-23-98	9-005(e)	12-23-98	16-012(j)	12-23-98	35-004(e)	05-02-01		
3-009(c)	05-02-01	9-005(f)	12-23-98	16-012(k)	12-23-98	35-006	05-02-01		
3-009(d)	09-04-02	9-005(h)	12-23-98	16-012(l)	12-23-98	35-011(a)	05-02-01		
3-009(e)	12-23-98	9-007	12-23-98	16-012(m)	12-23-98	35-013(d)	05-02-01		
3-009(f)	12-23-98	11-011(c)	05-02-01	16-012(n)	12-23-98	36-003(c)	12-23-98		
3-009(g)	05-02-01	11-007	12-23-98	16-012(o)	12-23-98	39-003	12-23-98		

SWMUs removed from Table A = 133

Proposed Table B Priority SWMUs*

SWMU Number	11-004(e)	16-008(b)	21-011(h)	36-003(a)
1-001(a)	11-005(a)	16-016	21-011(i)	36-003(b)
1-001(b)	11-005(b)	16-018	21-014	39-001(a)
1-001(c)	11-006(a)	16-019	21-015	39-001(b)
1-001(d)	13-004	16-020	21-016(a)	41-001
1-001(e)	15-002	16-021(a)	21-017(a)	46-002
1-001(f)	15-006(a)	18-001(a)	21-017(b)	46-006(a)
1-001(g)	15-006(b)	18-003(a)	21-017(c)	46-006(b)
1-002	15-006(c)	18-003(b)	21-018(a)	46-006(c)
1-003(a)	15-006(d)	18-003(c)	21-018(b)	46-006(d)
2-005	15-007(a)	18-003(d)	22-015(c)	46-007
2-008(a)	15-007(b)	18-003(e)	33-002(a)	49-001(a)
3-010(a)	15-007(c)	18-003(f)	33-002(b)	50-006(a)
3-012(b)	15-007(d)	18-003(g)	33-002(c)	50-006(c)
3-013(a)	15-008(a)	18-003(h)	33-017	50-006(d)
3-015	15-008(b)	21-006(a)	35-003(a)	50-009
3-029(a)	15-008(c)	21-006(b)	35-003(b)	54-004 (excluding
5-005(a)	15-008(d)	21-006(c)	35-003(c)	Shaft No. 9)
6-007(a)	15-009(a)	21-006(d)	35-003(d)	54-005
8-003(a)	15-009(b)	21-006(e)	35-003(e)	60-005(a)
9-008(a)	15-012(c)	21-010(a)	35-003(f)	73-001(a)
9-008(b)	15-012(d)	21-010(b)	35-003(g)	
9-009	15-012(e)	21-010(c)	35-003(h)	
9-013	15-012(f)	21-010(d)	35-003(j)	
10-003(a)	15-012(g)	21-010(e)	35-003(k)	
10-003(b)	16-001(b)	21-010(f)	35-003(l)	
10-003(c)	16-001(c)	21-010(g)	35-003(m)	
10-003(d)	16-001(d)	21-010(h)	35-003(n)	
10-003(e)	16-001(e)	21-011(a)	35-003(o)	
10-003(f)	16-005(n)	21-011(b)	35-003(p)	
10-006	16-006(a)	21-011(c)	35-003(q)	
11-004(a)	16-006(c)	21-011(d)	35-010(a)	
11-004(b)	16-006(d)	21-011(e)	35-010(b)	
11-004(c)	16-006(e)	21-011(f)	35-010(c)	
11-004(d)	16-007	21-011(g)	35-010(d)	

Total SWMUs
in Table B = 159

* As RFI work progresses, EPA may identify more SWMUs to be added to the list to be addressed in the installation work plans.

Proposed Table B.1
No Further Action SWMUs Removed from Table B
Through a Class III Permit Modification and Date of Removal

0-005	12-23-98	1-001(l)	12-23-98	8-003(b)	12-23-98	16-005(o)	12-23-98	36-003(c)	12-23-98
1-001(h)	12-23-98	1-001(m)		8-003(c)	12-23-98	16-006(f)	12-23-98	54-015(h)	05-02-01
1-001(i)	12-23-98	1-001(n)	12-23-98	8-007	12-23-98	21-012(a)	12-23-98		
1-001(j)	12-23-98	3-012(a)	12-23-98	15-012(a)	11-09-01	35-003(i)	12-23-98		
1-001(k)	12-23-98	3-020(a)	12-23-98	15-012(b)	11-09-01	35-006	05-02-01		

SWMUs removed
from Table B = 22

Proposed Table C

RFI Work Plan due July 7, 1994: Technical Area 16

16-005(a)
16-005(c)
16-005(d)
16-005(e)
16-005(h)
16-005(j)
16-005(k)
16-005(l)
16-005(m)
16-006(g)
16-006(h)
16-015(a)
16-015(b)
16-017
16-024(e)
16-025(a)
16-025(b)
16-025(b2)
16-025(c2)
16-025(d)
16-025(e)
16-025(f)
16-025(g)
16-025(h)
16-025(i)
16-025(j)
16-025(k)
16-025(l)
16-025(m)
16-025(n)
16-025(o)
16-025(p)
16-025(q)
16-025(r)
16-025(s)
16-025(t)
16-025(u)
16-025(v)
16-025(w)
16-025(x)
16-025(y)
16-025(z)
16-026(m)
16-026(n)
16-026(o)
16-026(p)
16-026(q)
16-026(s)
16-026(w)
16-028(a)
16-029(a2)
16-029(b2)
16-029(c2)
16-029(d2)
16-029(e2)
16-029(f2)
16-029(g2)
16-029(h2)
16-029(k)
16-029(l)
16-029(m)
16-029(n)
16-029(o)
16-029(p)
16-029(q)
16-029(r)
16-029(s)
16-029(t)
16-029(u)
16-029(v)
16-029(w)
16-029(x)
16-029(y)
16-029(z)
16-031(c)
16-031(d)
16-032(a)
16-032(c)
16-034(a)
16-034(b)
16-034(c)
16-034(d)
16-034(e)
16-034(f)
16-034(l)
16-034(m)
16-034(n)
16-034(o)
16-034(p)
C-16-025
C-16-026
Total SWMUs = 91*

RFI Work Plan due July 7, 1995: Technical Area 16

16-016(d)
16-016(e)
16-016(g)
16-025(a2)
16-025(d2)
16-026(a)
16-026(b2)
16-026(c2)
16-026(f)
16-026(g)
16-026(i)
16-026(j)
16-026(k2)
16-026(l)
16-026(r)
16-026(u)
16-026(y)
16-026(z)
16-028(b)
16-028(c)
16-028(d)
16-028(e)
16-029(h)
16-029(i)
16-029(j)
16-030(a)
16-030(c)
16-031(a)
16-031(b)
16-031(e)
16-031(f)
16-031(h)
16-034(h)
16-034(i)
16-034(j)
16-034(k)
Total SWMUs = 36

RFI Work Plan due May 21, 1995: Operable Unit 1114

3-009(i)
3-009(j)
3-011
3-021
3-025(b)
3-026(c)
3-029
3-031
3-034(a)
3-034(b)
3-043(c)
3-045(a)
3-045(b)
3-045(c)
3-045(e)
3-045(f)
3-045(g)
3-045(h)
3-049(a)
3-049(b)
3-049(e)
3-050(a)
3-050(d)
3-050(f)
3-050(g)
3-052(a)
3-052(e)
3-052(f)
3-054(a)
3-054(b)
3-054(c)
3-054(d)
3-054(e)
3-055(a)
3-055(c)
3-056(d)
3-056(l)
3-059
Total SWMUs = 38

* 20 additional SWMUs were added after work plan review

Proposed Table C.1
No Further Action SWMUs Removed from Table C
Through a Class III Permit Modification and Date of Removal

3-002(a)	05-02-01	3-046		16-006(i)	12-23-98	16-026(g2)		16-032(d)	12-23-98
3-002(d)	05-02-01	3-049(c)	05-02-01	16-025(c)	12-23-98	16-026(h)		16-032(e)	12-23-98
3-009(c)	05-02-01	3-049(d)	05-02-01	16-025(e2)		16-026(i2)	12-23-98	16-034(g)	12-23-98
3-019	05-02-01	3-050(e)	05-02-01	16-025(f2)		16-026(k)			
3-024	12-8-97	3-052(c)	05-02-01	16-025(g2)	12-23-98	16-026(t)		SWMUs removed from	
3-025(a)	05-02-01	3-055(d)	05-02-01	16-025(h2)		16-026(x)		Table C = 43	
3-026(b)	05-02-01	3-056(m)	05-02-01	16-026(a)		16-030(b)			
3-032	05-02-01	3-056(n)	05-02-01	16-026(d2)		16-030(e)			
3-045(d)	12-8-97	16-005(b)	05-02-01	16-026(e2)		16-030(f)			
3-045(i)	05-02-01	16-005(f)	12-23-98	16-026(f2)		16-031(g)	12-23-98		

Attachment 4: List of Materials from LAPSAR Meetings That Have Been Placed in NMED Administrative Record.

Meeting date	Materials Provided
1/29/02	LA/PC Surface Aggregate Report slides from 1/16/02
2/19/02	Water and sediment sampling summary
3/6/02	Geomorphic approach summary
3/18/02	Problem Formulation slides Draft Revised Sediment Eco-screen Meeting notes
3/28/02	Soil_COPECs_box_plots_TA-2_fixed.doc Sediment data pivot tables (3) COPEC notes
4/11/02	Canyons_TRVs.xls (spreadsheet of sources/values for benchmarks) Map of dioxin data from PRS 73-002 Dioxins TEQs Data Request Dioxin plots HI plots Terrestrial receptor HQ Table notes Podolsky thesis on metal contaminants
4/18/02*	HQ for max values for shrew, robin, plant, invert LAPSAR meeting notes sent 4/19/02 Metals Pre-and post-fire (summary sheet only) WRS results for selected metals
4/25/02	Graphs of revised HQ values for canyon contaminants Tables of HQs for robin, invert, plant, and shrew Table of LAPSAR contaminants
4/30/02*	LAPSAR Assessment Endpoints and Associated Measures-Terrestrial
5/02/02*	Graphs of revised HQs Stats by subreach_rev3
5/7/02	5/8/02 draft record of communication

* no meeting, followup document sent by e-mail

Canyons Focus Area Water Sampling Summary
(Working Dataset: 02/16/2002)

Hydro_Segment	Field_Prep	Gamma_Spec	Iso_Pu	Iso_U	Am_241	H_3	Sr_90	Tc_99	Other_ESH_Rads	TAL_Metals	Other_Metals	Other_ESH_Metals	Cn	Anion	Alkalinity	TOC	DOC	Cond	pH	Other_ESH_Misc_Parameters	PestPCB	SVOC	VOC	Humic_Substances	Other_ESH_Organics	TPH_DRO
LA, lower	Filtered	11	13	8	6		13		1	11	6	1	2	13	11		11	3	3	1				2		
LA, lower	Unfiltered	11	11	6	6	6	11	6	1	11	5		3	1		10				1	6	6	6		1	
LA, middle	Filtered	13	13	13	13		13		2	13	13	2	8	16	13		12	5	5	2				3		
LA, middle	Unfiltered	13	13	13	13	13	13	17	2	13	11		8	2		11				2	13	13	12		2	7
LA, upper	Filtered	18	18	18	18		18		2	18	18	2	11	18	17		16	2	2	2						
LA, upper	Unfiltered	16	16	16	16	16	16	18	2	16	15	1	11	3	1	14				2	16	16	16		2	
Pueblo, lower	Filtered	7	8	8	7		8		3	7	7	3	3	7	7		4	5	5	3				2		
Pueblo, lower	Unfiltered	6	6	6	6	6	6	3	3	6	6	3	5	3		3				3	6	6	6		3	
Pueblo, middle	Filtered	6	8	7	6		7		2	6	6	2		6	6		4	3	3	2				1		
Pueblo, middle	Unfiltered	8	8	8	8	6	8	4	2	6	6	2	2	2		4				2	5	6	6		2	
Pueblo, upper	Filtered	3	3	3	3		3		1	3	3	1	1	3	3		2	3	3	1				2		
Pueblo, upper	Unfiltered	3	3	3	3	3	3	2	1	3	3	1	2	1		2				1	3	3	3		1	

Analytical_Suite	Analyte_Name	Std_Reporting_Units
ALKALINITY	Alkalinity (total)	UG/L
AM-241	Americium-241	PCI/L
ANION	Ammonia (as N)	UG/L
ANION	Bromide	UG/L
ANION	Chloride	UG/L
ANION	Fluoride	UG/L
ANION	Oxalate	UG/L
ANION	Perchlorate	UG/L
ANION	Sulfate	UG/L
CN	Cyanide, Total	UG/L
COND	Conductivity	US/CM2
DOC	Dissolved Organic Carbon	UG/L
GAMMA_SPEC	Cesium-134	PCI/L
GAMMA_SPEC	Cesium-137	PCI/L
GAMMA_SPEC	Cobalt-60	PCI/L
GAMMA_SPEC	Europium-152	PCI/L
GAMMA_SPEC	Ruthenium-106	PCI/L
GAMMA_SPEC	Sodium-22	PCI/L
H-3	Tritium	PCI/L
HUMIC_SUBSTANCES	Humic Substances, Hydrophilic Acids	UG/L
HUMIC_SUBSTANCES	Humic Substances, Hydrophilic Bases	UG/L
HUMIC_SUBSTANCES	Humic Substances, Hydrophilic Neutrals	UG/L
HUMIC_SUBSTANCES	Humic Substances, Hydrophilic Total	UG/L
HUMIC_SUBSTANCES	Humic Substances, Hydrophobic Acids	UG/L
HUMIC_SUBSTANCES	Humic Substances, Hydrophobic Bases	UG/L
HUMIC_SUBSTANCES	Humic Substances, Hydrophobic Neutrals	UG/L
HUMIC_SUBSTANCES	Humic Substances, Hydrophobic Total	UG/L
ISO_PU	Plutonium-238	PCI/L
ISO_PU	Plutonium-239	PCI/L
ISO_U	Uranium-234	PCI/L
ISO_U	Uranium-235	PCI/L
ISO_U	Uranium-238	PCI/L
OTHER_METALS	Beryllium	UG/L
OTHER_METALS	Molybdenum	UG/L
Other ESH Metals	B	UG/L
Other ESH Metals	P	UG/L
Other ESH Metals	SN	UG/L

Analytical_Suite	Analyte_Name	Std_Reporting_Units
Other ESH Metals	SR	UG/L
Other ESH Metals	TI	UG/L
Other ESH Metals	U	UG/L
Other ESH Misc. Parameters	ALK-CO3	UG/L
Other ESH Misc. Parameters	ALK-HCO3	UG/L
Other ESH Misc. Parameters	HARDNESS	UG/L
Other ESH Misc. Parameters	NO3+NO2-N	UG/L
Other ESH Misc. Parameters	SIO2	UG/L
Other ESH Misc. Parameters	TDS	UG/L
Other ESH Misc. Parameters	TSS	UG/L
Other ESH Organics	Aroclor-1262	UG/L
Other ESH Organics	Chloroethylvinyl ether[2]	UG/L
Other ESH Organics	Diphenylamine	UG/L
Other ESH Organics	Diphenylhydrazine[1,2]	UG/L
Other ESH Organics	Picoline[2]	UG/L
Other ESH Rads	AC-228	PCI/L
Other ESH Rads	BA-133	PCI/L
Other ESH Rads	BE-7	PCI/L
Other ESH Rads	BI-211	PCI/L
Other ESH Rads	BI-212	PCI/L
Other ESH Rads	BI-214	PCI/L
Other ESH Rads	CD-109	PCI/L
Other ESH Rads	CE-139	PCI/L
Other ESH Rads	CE-141	PCI/L
Other ESH Rads	CE-144	PCI/L
Other ESH Rads	CO-57	PCI/L
Other ESH Rads	CR-51	PCI/L
Other ESH Rads	EU-154	PCI/L
Other ESH Rads	FE-59	PCI/L
Other ESH Rads	GROSSA	PCI/L
Other ESH Rads	GROSSB	PCI/L
Other ESH Rads	HG-203	PCI/L
Other ESH Rads	I-133	PCI/L
Other ESH Rads	K-40	PCI/L
Other ESH Rads	MN-54	PCI/L
Other ESH Rads	NB-95	PCI/L
Other ESH Rads	NP-237	PCI/L
Other ESH Rads	NP-239	PCI/L
Other ESH Rads	PA-231	PCI/L
Other ESH Rads	PA-233	PCI/L
Other ESH Rads	PA-234M	PCI/L
Other ESH Rads	PB-211	PCI/L
Other ESH Rads	PB-212	PCI/L
Other ESH Rads	PB-214	PCI/L
Other ESH Rads	RA-223	PCI/L
Other ESH Rads	RA-224	PCI/L

Analytical_Suite	Analyte_Name	Std_Reporting_Units
Other ESH Rads	RA-226	PCI/L
Other ESH Rads	RA-228	PCI/L
Other ESH Rads	RH-106	PCI/L
Other ESH Rads	RN-219	PCI/L
Other ESH Rads	RU-103	PCI/L
Other ESH Rads	SB-124	PCI/L
Other ESH Rads	SB-125	PCI/L
Other ESH Rads	SE-75	PCI/L
Other ESH Rads	SN-113	PCI/L
Other ESH Rads	SR-85	PCI/L
Other ESH Rads	TH-227	PCI/L
Other ESH Rads	TH-231	PCI/L
Other ESH Rads	TH-234	PCI/L
Other ESH Rads	TL-208	PCI/L
Other ESH Rads	Y-88	PCI/L
Other ESH Rads	ZN-65	PCI/L
Other ESH Rads	ZR-95	PCI/L
PESTPCB	Aldrin	UG/L
PESTPCB	Aroclor-1016	UG/L
PESTPCB	Aroclor-1221	UG/L
PESTPCB	Aroclor-1232	UG/L
PESTPCB	Aroclor-1242	UG/L
PESTPCB	Aroclor-1248	UG/L
PESTPCB	Aroclor-1254	UG/L
PESTPCB	Aroclor-1260	UG/L
PESTPCB	BHC[alpha-]	UG/L
PESTPCB	BHC[beta-]	UG/L
PESTPCB	BHC[delta-]	UG/L
PESTPCB	BHC[gamma-]	UG/L
PESTPCB	Chlordane[alpha-]	UG/L
PESTPCB	Chlordane[gamma-]	UG/L
PESTPCB	DDD[4,4'-]	UG/L
PESTPCB	DDE[4,4'-]	UG/L
PESTPCB	DDT[4,4'-]	UG/L
PESTPCB	Dieldrin	UG/L
PESTPCB	Endosulfan I	UG/L
PESTPCB	Endosulfan II	UG/L
PESTPCB	Endosulfan Sulfate	UG/L
PESTPCB	Endrin	UG/L
PESTPCB	Endrin Aldehyde	UG/L
PESTPCB	Endrin Ketone	UG/L
PESTPCB	Heptachlor	UG/L
PESTPCB	Heptachlor Epoxide	UG/L
PESTPCB	Methoxychlor[4,4'-]	UG/L
PESTPCB	Toxaphene (Technical Grade)	UG/L
PH	pH	SU

Analytical_Suite	Analyte_Name	Std_Reporting_Units
SR-90	Strontium-90	PCI/L
SVOC	Acenaphthene	UG/L
SVOC	Acenaphthylene	UG/L
SVOC	Aniline	UG/L
SVOC	Anthracene	UG/L
SVOC	Azobenzene	UG/L
SVOC	Benzidine	UG/L
SVOC	Benzo(a)anthracene	UG/L
SVOC	Benzo(a)pyrene	UG/L
SVOC	Benzo(b)fluoranthene	UG/L
SVOC	Benzo(g,h,i)perylene	UG/L
SVOC	Benzo(k)fluoranthene	UG/L
SVOC	Benzoic Acid	UG/L
SVOC	Benzyl Alcohol	UG/L
SVOC	Bis(2-chloroethoxy)methane	UG/L
SVOC	Bis(2-chloroethyl)ether	UG/L
SVOC	Bis(2-ethylhexyl)phthalate	UG/L
SVOC	Bromophenyl-phenylether[4-]	UG/L
SVOC	Butylbenzylphthalate	UG/L
SVOC	Carbazole	UG/L
SVOC	Chloro-3-methylphenol[4-]	UG/L
SVOC	Chloroaniline[4-]	UG/L
SVOC	Chloronaphthalene[2-]	UG/L
SVOC	Chlorophenol[2-]	UG/L
SVOC	Chlorophenyl-phenyl[4-] Ether	UG/L
SVOC	Chrysene	UG/L
SVOC	Di-n-butylphthalate	UG/L
SVOC	Di-n-octylphthalate	UG/L
SVOC	Dibenz(a,h)anthracene	UG/L
SVOC	Dibenzofuran	UG/L
SVOC	Dichlorobenzene[1,2-]	UG/L
SVOC	Dichlorobenzene[1,3-]	UG/L
SVOC	Dichlorobenzene[1,4-]	UG/L
SVOC	Dichlorobenzidine[3,3'-]	UG/L
SVOC	Dichlorophenol[2,4-]	UG/L
SVOC	Diethylphthalate	UG/L
SVOC	Dimethyl Phthalate	UG/L
SVOC	Dimethylphenol[2,4-]	UG/L
SVOC	Dinitro-2-methylphenol[4,6-]	UG/L
SVOC	Dinitrophenol[2,4-]	UG/L
SVOC	Dinitrotoluene[2,4-]	UG/L
SVOC	Dinitrotoluene[2,6-]	UG/L
SVOC	Fluoranthene	UG/L
SVOC	Fluorene	UG/L
SVOC	Hexachlorobenzene	UG/L
SVOC	Hexachlorobutadiene	UG/L
SVOC	Hexachlorocyclopentadiene	UG/L
SVOC	Hexachloroethane	UG/L

Analytical_Suite	Analyte_Name	Std_Reporting_Units
SVOC	Indeno(1,2,3-cd)pyrene	UG/L
SVOC	Isophorone	UG/L
SVOC	Methylnaphthalene[2-]	UG/L
SVOC	Methylphenol[2-]	UG/L
SVOC	Methylphenol[4-]	UG/L
SVOC	Naphthalene	UG/L
SVOC	Nitroaniline[2-]	UG/L
SVOC	Nitroaniline[3-]	UG/L
SVOC	Nitroaniline[4-]	UG/L
SVOC	Nitrobenzene	UG/L
SVOC	Nitrophenol[2-]	UG/L
SVOC	Nitrophenol[4-]	UG/L
SVOC	Nitroso-di-n-propylamine[N-]	UG/L
SVOC	Nitrosodimethylamine[N-]	UG/L
SVOC	Nitrosodiphenylamine[N-]	UG/L
SVOC	Oxybis(1-chloropropane)[2,2'-]	UG/L
SVOC	Pentachlorophenol	UG/L
SVOC	Phenanthrene	UG/L
SVOC	Phenol	UG/L
SVOC	Pyrene	UG/L
SVOC	Pyridine	UG/L
SVOC	Trichlorobenzene[1,2,4-]	UG/L
SVOC	Trichlorophenol[2,4,5-]	UG/L
SVOC	Trichlorophenol[2,4,6-]	UG/L
TAL_METALS	Aluminum	UG/L
TAL_METALS	Antimony	UG/L
TAL_METALS	Arsenic	UG/L
TAL_METALS	Barium	UG/L
TAL_METALS	Beryllium	UG/L
TAL_METALS	Cadmium	UG/L
TAL_METALS	Calcium	UG/L
TAL_METALS	Chromium (total)	UG/L
TAL_METALS	Cobalt	UG/L
TAL_METALS	Copper	UG/L
TAL_METALS	Iron	UG/L
TAL_METALS	Lead	UG/L
TAL_METALS	Magnesium	UG/L
TAL_METALS	Manganese	UG/L
TAL_METALS	Mercury	UG/L
TAL_METALS	Nickel	UG/L
TAL_METALS	Potassium	UG/L
TAL_METALS	Selenium	UG/L
TAL_METALS	Silver	UG/L
TAL_METALS	Sodium	UG/L
TAL_METALS	Thallium	UG/L
TAL_METALS	Vanadium	UG/L
TAL_METALS	Zinc	UG/L

Analytical_Suite	Analyte_Name	Std_Reporting_Units
TC-99	Technetium-99	PCI/L
TOC	Total Organic Carbon	UG/L
TPH_DRO	Diesel Range Organics	UG/L
VOC	Acetone	UG/L
VOC	Benzene	UG/L
VOC	Bromobenzene	UG/L
VOC	Bromochloromethane	UG/L
VOC	Bromodichloromethane	UG/L
VOC	Bromoform	UG/L
VOC	Bromomethane	UG/L
VOC	Butanone[2-]	UG/L
VOC	Butylbenzene[n-]	UG/L
VOC	Butylbenzene[sec-]	UG/L
VOC	Butylbenzene[tert-]	UG/L
VOC	Carbon Disulfide	UG/L
VOC	Carbon Tetrachloride	UG/L
VOC	Chlorobenzene	UG/L
VOC	Chlorodibromomethane	UG/L
VOC	Chloroethane	UG/L
VOC	Chloroform	UG/L
VOC	Chloromethane	UG/L
VOC	Chlorotoluene[2-]	UG/L
VOC	Chlorotoluene[4-]	UG/L
VOC	Dibromo-3-chloropropane[1,2-]	UG/L
VOC	Dibromoethane[1,2-]	UG/L
VOC	Dibromomethane	UG/L
VOC	Dichlorobenzene[1,2-]	UG/L
VOC	Dichlorobenzene[1,3-]	UG/L
VOC	Dichlorobenzene[1,4-]	UG/L
VOC	Dichlorodifluoromethane	UG/L
VOC	Dichloroethane[1,1-]	UG/L
VOC	Dichloroethane[1,2-]	UG/L
VOC	Dichloroethene[1,1-]	UG/L
VOC	Dichloroethene[cis-1,2-]	UG/L
VOC	Dichloroethene[trans-1,2-]	UG/L
VOC	Dichloropropane[1,2-]	UG/L
VOC	Dichloropropane[1,3-]	UG/L
VOC	Dichloropropane[2,2-]	UG/L
VOC	Dichloropropene[1,1-]	UG/L
VOC	Dichloropropene[cis-1,3-]	UG/L
VOC	Dichloropropene[trans-1,3-]	UG/L
VOC	Ethylbenzene	UG/L
VOC	Hexachlorobutadiene	UG/L
VOC	Hexanone[2-]	UG/L
VOC	Iodomethane	UG/L
VOC	Isopropylbenzene	UG/L

Analytical_Suite	Analyte_Name	Std_Reporting_Units
VOC	Isopropyltoluene[4-]	UG/L
VOC	Methyl-2-pentanone[4-]	UG/L
VOC	Methylene Chloride	UG/L
VOC	Naphthalene	UG/L
VOC	Propylbenzene[1-]	UG/L
VOC	Styrene	UG/L
VOC	Tetrachloroethane[1,1,1,2-]	UG/L
VOC	Tetrachloroethane[1,1,2,2-]	UG/L
VOC	Tetrachloroethene	UG/L
VOC	Toluene	UG/L
VOC	Trichloro-1,2,2-trifluoroethane[1,1,2-]	UG/L
VOC	Trichlorobenzene[1,2,3-]	UG/L
VOC	Trichlorobenzene[1,2,4-]	UG/L
VOC	Trichloroethane[1,1,1-]	UG/L
VOC	Trichloroethane[1,1,2-]	UG/L
VOC	Trichloroethene	UG/L
VOC	Trichlorofluoromethane	UG/L
VOC	Trichloropropane[1,2,3-]	UG/L
VOC	Trimethylbenzene[1,2,4-]	UG/L
VOC	Trimethylbenzene[1,3,5-]	UG/L
VOC	Vinyl Chloride	UG/L
VOC	Xylene (Total)	UG/L
VOC	Xylene[1,2-]	UG/L

Canyons Focus Area Sediment Sampling Summary
(Working Dataset 02-15-2002)

SubReach	Gross_AB	Gross_G	Gamma_Spec	Iso_Pu	Iso_U	Iso_Th	Am_241	H_3	Sr_90	Ra_226	TAL_Metals	Limited_list_TAL_Metals	Other_Metals	Lead	Uranium	Mercury	Methyl_Mercury	Cn	Anion	Alkalinity	TOC	Pest	PestPCB	PCB	PCB_Cong	SVOC	VOC	EPA_Method_8290	Ethanol	TPH_DRO	TPH_GRO	TPH_Kerosene	TPH_Stoddard
AC-1			9	6	6		3	6	6		6								3				3	3		6							
AC-2			9	6	6		3	6	6		6								3				3	3		6							
AC-3	2	1	12	23	7	2	2	7	10		12		2		2			2			1		6	3		6							
ACS			6	12	6			4	4		5					1	2		1				8			9							
ACS Removed			17	63	7			7	16		16					2	2		5				11	7	1	8							
Baseline			8	8	8	7	7		8		7								7	7	7					7		7					
DP-1W			2	3	3		1	3	3		7			1									3	1		7	1			7	1		
DP-1C			2	6	6		5	6	6		21			9										8		22	16		3	23	17	1	1
DP-1E			3	3	3			3	3		7											1	1	4		8	1			7			
DP-2			35	23	7			7	34		11											4	6	4		10	4			7			
DP-3			21	13	1			4	10		7											1	6	1		7	1			6			
DP-4	1		18	19	9	1	1	9	18		10		1		1			1					10	8		18				9			
LA-0																							8		2	14							
LA-1FW			3	3	3		3				3												11			14							
LA-1W+				5	5						5												5	1	1	3							
LA-1W			3	27	5		3				8												3	4	1	3							
LA-1C *			73	95	72		2	71	74		76				71				7			4	2	13	1	62	4						
LA-1E			3	24	5		3				6											3	3	7	1	6							
LA-2W	2		7	20	5	2	4	3	15	1	5		2		2			2				3	3	5		6							
LA-2E	5		37	23	6	5	5	6	20	1	6		5		5			5					5	1		6							
LA-2E Removed	2		13	7	2	2	2	2	13		2		2		2			2					2			2							
LA-2FE			55	55	6			6	51		6												6			6							
LA-3W			15	15	6			6	12		6												6			6							
LA-3E	6	6	44	21	8	6	6	8	19		8				6			8					13			21		2					
LA-4W			45	46					10		5												2										
LA-4E			29	29					10		7												5										
LA-5	14	7	23	44	20	14	14	20	20		20		14		14			20			7		7			7		6					
P-1FW											6												7			7							
P-1W	2	1	10	10	2	2	2	2	8		15		2		2	2	2	2			1		6			6							
P-1E	10	5	21	70	10	10	10	10	18		21		10		10	2	2	10			5		5			5							
WC											6												6			6							
P-2W			8	40							8	8											6										
P-2E				34																													
P-3W			11	37					3		11	3											6										
P-3E			4	32					4		4																						
P-4W	4		6	51	4	4	1	4	4		6		5		5			4			4		4			4							
P-4E	5		13	36	5	5		5	13		13		5		5			5			5		5			5							

* this includes samples from TA-2 for post-CGF sampling and some of these samples are likely not sediments and will be removed from the data set

Analytical_Suite	Analyte_Name	Std_Reporting_Units
ALKALINITY	Bicarbonate (as CaCO3)	MG/KG
ALKALINITY	Carbonate (as CaCo3)	MG/KG
AM-241	Americium-241	PCI/G
ANION	Bromide	MG/KG
ANION	Chloride	MG/KG
ANION	Fluoride	MG/KG
ANION	Perchlorate	MG/KG
ANION	Sulfate	MG/KG
CN	Cyanide, Total	MG/KG
EPA_METHOD_8290	Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	MG/KG
EPA_METHOD_8290	Heptachlorodibenzodioxins (Total)	MG/KG
EPA_METHOD_8290	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	MG/KG
EPA_METHOD_8290	Heptachlorodibenzofuran[1,2,3,4,7,8,9-]	MG/KG
EPA_METHOD_8290	Heptachlorodibenzofurans (Total)	MG/KG
EPA_METHOD_8290	Hexachlorodibenzodioxin[1,2,3,4,7,8-]	MG/KG
EPA_METHOD_8290	Hexachlorodibenzodioxin[1,2,3,6,7,8-]	MG/KG
EPA_METHOD_8290	Hexachlorodibenzodioxin[1,2,3,7,8,9-]	MG/KG
EPA_METHOD_8290	Hexachlorodibenzodioxins (Total)	MG/KG
EPA_METHOD_8290	Hexachlorodibenzofuran[1,2,3,4,7,8-]	MG/KG
EPA_METHOD_8290	Hexachlorodibenzofuran[1,2,3,6,7,8-]	MG/KG
EPA_METHOD_8290	Hexachlorodibenzofuran[1,2,3,7,8,9-]	MG/KG
EPA_METHOD_8290	Hexachlorodibenzofuran[2,3,4,6,7,8-]	MG/KG
EPA_METHOD_8290	Hexachlorodibenzofurans (Total)	MG/KG
EPA_METHOD_8290	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	MG/KG
EPA_METHOD_8290	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	MG/KG
EPA_METHOD_8290	Pentachlorodibenzodioxin[1,2,3,7,8-]	MG/KG
EPA_METHOD_8290	Pentachlorodibenzodioxins (Total)	MG/KG
EPA_METHOD_8290	Pentachlorodibenzofuran[1,2,3,7,8-]	MG/KG
EPA_METHOD_8290	Pentachlorodibenzofuran[2,3,4,7,8-]	MG/KG
EPA_METHOD_8290	Pentachlorodibenzofurans (Totals)	MG/KG
EPA_METHOD_8290	Tetrachlorodibenzodioxin[2,3,7,8-]	MG/KG
EPA_METHOD_8290	Tetrachlorodibenzodioxins (Total)	MG/KG
EPA_METHOD_8290	Tetrachlorodibenzofuran[2,3,7,8-]	MG/KG
EPA_METHOD_8290	Tetrachlorodibenzofurans (Totals)	MG/KG
ETHANOL	Ethanol	MG/KG
GAMMA_SPEC	Americium-241	PCI/G
GAMMA_SPEC	Cesium-134	PCI/G
GAMMA_SPEC	Cesium-137	PCI/G
GAMMA_SPEC	Cobalt-60	PCI/G
GAMMA_SPEC	Europium-152	PCI/G
GAMMA_SPEC	Protactinium-233	PCI/G
GAMMA_SPEC	Ruthenium-106	PCI/G
GAMMA_SPEC	Sodium-22	PCI/G

Analytical_Suite	Analyte_Name	Std_Reporting_Units
GAMMA_SPEC	Uranium-235	PCI/G
GROSS_AB	Gross Alpha Radiation	PCI/G
GROSS_AB	Gross Beta Radiation	PCI/G
GROSS_G	Gross Gamma Radiation	PCI/G
H-3	Tritium	PCI/G
ISO_PU	Plutonium-238	PCI/G
ISO_PU	Plutonium-239	PCI/G
ISO_TH	Thorium-227	PCI/G
ISO_TH	Thorium-228	PCI/G
ISO_TH	Thorium-230	PCI/G
ISO_TH	Thorium-232	PCI/G
ISO_U	Uranium-234	PCI/G
ISO_U	Uranium-235	PCI/G
ISO_U	Uranium-238	PCI/G
LEAD	Lead	MG/KG
LIMITED_LIST_TAL_METALS	Aluminum	MG/KG
LIMITED_LIST_TAL_METALS	Antimony	MG/KG
LIMITED_LIST_TAL_METALS	Arsenic	MG/KG
LIMITED_LIST_TAL_METALS	Barium	MG/KG
LIMITED_LIST_TAL_METALS	Beryllium	MG/KG
LIMITED_LIST_TAL_METALS	Cadmium	MG/KG
LIMITED_LIST_TAL_METALS	Calcium	MG/KG
LIMITED_LIST_TAL_METALS	Chromium, Total	MG/KG
LIMITED_LIST_TAL_METALS	Cobalt	MG/KG
LIMITED_LIST_TAL_METALS	Copper	MG/KG
LIMITED_LIST_TAL_METALS	Iron	MG/KG
LIMITED_LIST_TAL_METALS	Lead	MG/KG
LIMITED_LIST_TAL_METALS	Magnesium	MG/KG
LIMITED_LIST_TAL_METALS	Manganese	MG/KG
LIMITED_LIST_TAL_METALS	Mercury	MG/KG
LIMITED_LIST_TAL_METALS	Nickel	MG/KG
LIMITED_LIST_TAL_METALS	Potassium	MG/KG
LIMITED_LIST_TAL_METALS	Selenium	MG/KG
LIMITED_LIST_TAL_METALS	Sodium	MG/KG
LIMITED_LIST_TAL_METALS	Thallium	MG/KG
LIMITED_LIST_TAL_METALS	Vanadium	MG/KG
LIMITED_LIST_TAL_METALS	Zinc	MG/KG
MERCURY	Mercury	MG/KG
METHYL MERCURY	Methylmercury(+1) Ion	MG/KG

Analytical_Suite	Analyte_Name	Std_Reporting_Units
OTHER_METALS	Boron	MG/KG
OTHER_METALS	Titanium	MG/KG
PCB	Aroclor-1016	MG/KG
PCB	Aroclor-1221	MG/KG
PCB	Aroclor-1232	MG/KG
PCB	Aroclor-1242	MG/KG
PCB	Aroclor-1248	MG/KG
PCB	Aroclor-1254	MG/KG
PCB	Aroclor-1260	MG/KG
PCB_CONG	Decachlorobiphenyl	MG/KG
PCB_CONG	PCB-101	MG/KG
PCB_CONG	PCB-105	MG/KG
PCB_CONG	PCB-114	MG/KG
PCB_CONG	PCB-118	MG/KG
PCB_CONG	PCB-123	MG/KG
PCB_CONG	PCB-126	MG/KG
PCB_CONG	PCB-128	MG/KG
PCB_CONG	PCB-138	MG/KG
PCB_CONG	PCB-153	MG/KG
PCB_CONG	PCB-156	MG/KG
PCB_CONG	PCB-157	MG/KG
PCB_CONG	PCB-167	MG/KG
PCB_CONG	PCB-169	MG/KG
PCB_CONG	PCB-170	MG/KG
PCB_CONG	PCB-18	MG/KG
PCB_CONG	PCB-180	MG/KG
PCB_CONG	PCB-187	MG/KG
PCB_CONG	PCB-189	MG/KG
PCB_CONG	PCB-195	MG/KG
PCB_CONG	PCB-206	MG/KG
PCB_CONG	PCB-28	MG/KG
PCB_CONG	PCB-44	MG/KG
PCB_CONG	PCB-52	MG/KG
PCB_CONG	PCB-66	MG/KG
PCB_CONG	PCB-77	MG/KG
PCB_CONG	PCB-8	MG/KG
PCB_CONG	PCB-81	MG/KG
PEST	Aldrin	MG/KG
PEST	BHC[alpha-]	MG/KG
PEST	BHC[beta-]	MG/KG
PEST	BHC[delta-]	MG/KG
PEST	BHC[gamma-]	MG/KG
PEST	Chlordane[alpha-]	MG/KG
PEST	Chlordane[gamma-]	MG/KG
PEST	DDD[4,4'-]	MG/KG

Analytical_Suite	Analyte_Name	Std_Reporting_Units
PEST	DDE[4,4'-]	MG/KG
PEST	DDT[4,4'-]	MG/KG
PEST	Dieldrin	MG/KG
PEST	Endosulfan I	MG/KG
PEST	Endosulfan II	MG/KG
PEST	Endosulfan Sulfate	MG/KG
PEST	Endrin	MG/KG
PEST	Endrin Aldehyde	MG/KG
PEST	Endrin Ketone	MG/KG
PEST	Heptachlor	MG/KG
PEST	Heptachlor Epoxide	MG/KG
PEST	Methoxychlor[4,4'-]	MG/KG
PEST	Toxaphene (Technical Grade)	MG/KG
PESTPCB	Aldrin	MG/KG
PESTPCB	Aroclor-1016	MG/KG
PESTPCB	Aroclor-1221	MG/KG
PESTPCB	Aroclor-1232	MG/KG
PESTPCB	Aroclor-1242	MG/KG
PESTPCB	Aroclor-1248	MG/KG
PESTPCB	Aroclor-1254	MG/KG
PESTPCB	Aroclor-1260	MG/KG
PESTPCB	BHC[alpha-]	MG/KG
PESTPCB	BHC[beta-]	MG/KG
PESTPCB	BHC[delta-]	MG/KG
PESTPCB	BHC[gamma-]	MG/KG
PESTPCB	Chlordane (Technical Grade)	MG/KG
PESTPCB	Chlordane[alpha-]	MG/KG
PESTPCB	Chlordane[gamma-]	MG/KG
PESTPCB	DDD[4,4'-]	MG/KG
PESTPCB	DDE[4,4'-]	MG/KG
PESTPCB	DDT[4,4'-]	MG/KG
PESTPCB	Dieldrin	MG/KG
PESTPCB	Endosulfan I	MG/KG
PESTPCB	Endosulfan II	MG/KG
PESTPCB	Endosulfan Sulfate	MG/KG
PESTPCB	Endrin	MG/KG
PESTPCB	Endrin Aldehyde	MG/KG
PESTPCB	Endrin Ketone	MG/KG
PESTPCB	Heptachlor	MG/KG
PESTPCB	Heptachlor Epoxide	MG/KG
PESTPCB	Methoxychlor[4,4'-]	MG/KG
PESTPCB	Toxaphene (Technical Grade)	MG/KG
RA-226	Radium-226	PCI/G
SR-90	Strontium-90	PCI/G
SVOC	Acenaphthene	MG/KG

Analytical_Suite	Analyte_Name	Std_Reporting_Units
SVOC	Acenaphthylene	MG/KG
SVOC	Aniline	MG/KG
SVOC	Anthracene	MG/KG
SVOC	Azobenzene	MG/KG
SVOC	Benzidine	MG/KG
SVOC	Benzo(a)anthracene	MG/KG
SVOC	Benzo(a)pyrene	MG/KG
SVOC	Benzo(b)fluoranthene	MG/KG
SVOC	Benzo(g,h,i)perylene	MG/KG
SVOC	Benzo(k)fluoranthene	MG/KG
SVOC	Benzoic Acid	MG/KG
SVOC	Benzyl Alcohol	MG/KG
SVOC	Bis(2-chloroethoxy)methane	MG/KG
SVOC	Bis(2-chloroethyl)ether	MG/KG
SVOC	Bis(2-ethylhexyl)phthalate	MG/KG
SVOC	Bromophenyl-phenylether[4-]	MG/KG
SVOC	Butylbenzylphthalate	MG/KG
SVOC	Carbazole	MG/KG
SVOC	Chloro-3-methylphenol[4-]	MG/KG
SVOC	Chloroaniline[4-]	MG/KG
SVOC	Chloronaphthalene[2-]	MG/KG
SVOC	Chlorophenol[2-]	MG/KG
SVOC	Chlorophenyl-phenyl[4-] Ether	MG/KG
SVOC	Chrysene	MG/KG
SVOC	Dibenz(a,h)anthracene	MG/KG
SVOC	Dibenzofuran	MG/KG
SVOC	Dichlorobenzene[1,2-]	MG/KG
SVOC	Dichlorobenzene[1,3-]	MG/KG
SVOC	Dichlorobenzene[1,4-]	MG/KG
SVOC	Dichlorobenzidine[3,3'-]	MG/KG
SVOC	Dichlorophenol[2,4-]	MG/KG
SVOC	Diethylphthalate	MG/KG
SVOC	Dimethyl Phthalate	MG/KG
SVOC	Dimethylphenol[2,4-]	MG/KG
SVOC	Di-n-butylphthalate	MG/KG
SVOC	Dinitro-2-methylphenol[4,6-]	MG/KG
SVOC	Dinitrophenol[2,4-]	MG/KG
SVOC	Dinitrotoluene[2,4-]	MG/KG
SVOC	Dinitrotoluene[2,6-]	MG/KG
SVOC	Di-n-octylphthalate	MG/KG
SVOC	Fluoranthene	MG/KG
SVOC	Fluorene	MG/KG
SVOC	Hexachlorobenzene	MG/KG
SVOC	Hexachlorobutadiene	MG/KG
SVOC	Hexachlorocyclopentadiene	MG/KG
SVOC	Hexachloroethane	MG/KG
SVOC	Indeno(1,2,3-cd)pyrene	MG/KG
SVOC	Isophorone	MG/KG
SVOC	Methylnaphthalene[2-]	MG/KG

Analytical_Suite	Analyte_Name	Std_Reporting_Units
SVOC	Methylphenol[2-]	MG/KG
SVOC	Methylphenol[4-]	MG/KG
SVOC	Naphthalene	MG/KG
SVOC	Nitroaniline[2-]	MG/KG
SVOC	Nitroaniline[3-]	MG/KG
SVOC	Nitroaniline[4-]	MG/KG
SVOC	Nitrobenzene	MG/KG
SVOC	Nitrophenol[2-]	MG/KG
SVOC	Nitrophenol[4-]	MG/KG
SVOC	Nitrosodimethylamine[N-]	MG/KG
SVOC	Nitroso-di-n-propylamine[N-]	MG/KG
SVOC	Nitrosodiphenylamine[N-]	MG/KG
SVOC	Oxybis(1-chloropropane)[2,2'-]	MG/KG
SVOC	Pentachlorophenol	MG/KG
SVOC	Phenanthrene	MG/KG
SVOC	Phenol	MG/KG
SVOC	Pyrene	MG/KG
SVOC	Pyridine	MG/KG
SVOC	Trichlorobenzene[1,2,4-]	MG/KG
SVOC	Trichlorophenol[2,4,5-]	MG/KG
SVOC	Trichlorophenol[2,4,6-]	MG/KG
TAL_METALS	Aluminum	MG/KG
TAL_METALS	Antimony	MG/KG
TAL_METALS	Arsenic	MG/KG
TAL_METALS	Barium	MG/KG
TAL_METALS	Beryllium	MG/KG
TAL_METALS	Cadmium	MG/KG
TAL_METALS	Calcium	MG/KG
TAL_METALS	Chromium, Total	MG/KG
TAL_METALS	Cobalt	MG/KG
TAL_METALS	Copper	MG/KG
TAL_METALS	Iron	MG/KG
TAL_METALS	Lead	MG/KG
TAL_METALS	Magnesium	MG/KG
TAL_METALS	Manganese	MG/KG
TAL_METALS	Mercury	MG/KG
TAL_METALS	Nickel	MG/KG
TAL_METALS	Potassium	MG/KG
TAL_METALS	Selenium	MG/KG
TAL_METALS	Silver	MG/KG
TAL_METALS	Sodium	MG/KG
TAL_METALS	Thallium	MG/KG
TAL_METALS	Vanadium	MG/KG
TAL_METALS	Zinc	MG/KG
TOC	Total Organic Carbon	MG/KG
TPH_DRO	Diesel Range Organics	MG/KG

Analytical_Suite	Analyte_Name	Std_Reporting_Units
TPH_GRO	Gasoline Range Organics	MG/KG
TPH_KEROSENE	Kerosene	MG/KG
TPH_STODDARD	Stoddard Solvent	MG/KG
URANIUM	Total Uranium by ICPMS	MG/KG
URANIUM	Uranium	MG/KG
VOC	Acetone	MG/KG
VOC	Benzene	MG/KG
VOC	Bromobenzene	MG/KG
VOC	Bromochloromethane	MG/KG
VOC	Bromodichloromethane	MG/KG
VOC	Bromoform	MG/KG
VOC	Bromomethane	MG/KG
VOC	Butanone[2-]	MG/KG
VOC	Butylbenzene[n-]	MG/KG
VOC	Butylbenzene[sec-]	MG/KG
VOC	Butylbenzene[tert-]	MG/KG
VOC	Carbon Disulfide	MG/KG
VOC	Carbon Tetrachloride	MG/KG
VOC	Chlorobenzene	MG/KG
VOC	Chlorodibromomethane	MG/KG
VOC	Chloroethane	MG/KG
VOC	Chloroform	MG/KG
VOC	Chloromethane	MG/KG
VOC	Chlorotoluene[2-]	MG/KG
VOC	Chlorotoluene[4-]	MG/KG
VOC	Dibromo-3-chloropropane[1,2-]	MG/KG
VOC	Dibromoethane[1,2-]	MG/KG
VOC	Dibromomethane	MG/KG
VOC	Dichlorobenzene[1,2-]	MG/KG
VOC	Dichlorobenzene[1,3-]	MG/KG
VOC	Dichlorobenzene[1,4-]	MG/KG
VOC	Dichlorodifluoromethane	MG/KG
VOC	Dichloroethane[1,1-]	MG/KG
VOC	Dichloroethane[1,2-]	MG/KG
VOC	Dichloroethene[1,1-]	MG/KG
VOC	Dichloroethene[cis-1,2-]	MG/KG
VOC	Dichloroethene[trans-1,2-]	MG/KG
VOC	Dichloropropane[1,2-]	MG/KG
VOC	Dichloropropane[1,3-]	MG/KG
VOC	Dichloropropane[2,2-]	MG/KG
VOC	Dichloropropene[1,1-]	MG/KG
VOC	Dichloropropene[cis-1,3-]	MG/KG
VOC	Dichloropropene[trans-1,3-]	MG/KG
VOC	Ethylbenzene	MG/KG
VOC	Hexanone[2-]	MG/KG
VOC	Iodomethane	MG/KG
VOC	Isopropylbenzene	MG/KG

Analytical_Suite	Analyte_Name	Std_Reporting_Units
VOC	Isopropyltoluene[4-]	MG/KG
VOC	Methyl-2-pentanone[4-]	MG/KG
VOC	Methylene Chloride	MG/KG
VOC	Propylbenzene[1-]	MG/KG
VOC	Styrene	MG/KG
VOC	Tetrachloroethane[1,1,1,2-]	MG/KG
VOC	Tetrachloroethane[1,1,2,2-]	MG/KG
VOC	Tetrachloroethene	MG/KG
VOC	Toluene	MG/KG
VOC	Trichloro-1,2,2-trifluoroethane[1,1,2-]	MG/KG
VOC	Trichloroethane[1,1,1-]	MG/KG
VOC	Trichloroethane[1,1,2-]	MG/KG
VOC	Trichloroethene	MG/KG
VOC	Trichlorofluoromethane	MG/KG
VOC	Trichloropropane[1,2,3-]	MG/KG
VOC	Trimethylbenzene[1,2,4-]	MG/KG
VOC	Trimethylbenzene[1,3,5-]	MG/KG
VOC	Vinyl Chloride	MG/KG
VOC	Xylene (Total)	MG/KG
VOC	Xylene[1,2-]	MG/KG

LA/Pueblo Problem Formulation References **2/19/02**

1) Ecological Baseline Studies in Los Alamos and Guaje Canyons, County of Los Alamos, New Mexico, A Two-Year Study. Compiled by Teralene S. Foxx. Los Alamos National Laboratory Report LA-13065-MS, Los Alamos, New Mexico, November, 1995. Available on-line at http://lib-www.lanl.gov/pubs/la-13065.htm

2) Organic and Metal Contaminants in a Food Chain of the American Peregrine Falcon (*Falco peregrinus*) at the Los Alamos National Laboratory. Masters Thesis by Jill S. Podolsky. New Mexico State University, Las Cruces, New Mexico, May, 2000.

3) Radionuclide Concentrations in Pinto Beans, Sweet Corn, and Zucchini Squash grown in Los Alamos Canyon at Los Alamos National Laboratory. Fresquez, P. R., Armstrong, D. R., Mullen, M. A., Naranjo, L., Los Alamos National Laboratory Report LA-13304-MS, Los Alamos, New Mexico, May, 1997. Available on-line at http://lib-www.lanl.gov/la-pubs/00326285.pdf

4) A Spatially-Dynamic Preliminary Risk Assessment of the American Peregrine Falcon at the Los Alamos National Laboratory (Version 1). Gallegos, A.F., Gonzales, G.J., Bennett, K.D., Pratt, L.E., Cram, D.S., Los Alamos National Laboratory Report LA-13321-MS, Los Alamos, New Mexico, June 1997. Available on-line in two parts: http://lib-www.lanl.gov/la-pubs/00326466.pdf & http://lib-www.lanl.gov/la-pubs/00326467.pdf

5) Second Annual Review Update Preliminary Risk Assessment of Federally Protected Species at the Los Alamos National Laboratory. Gonzales, G.J., Gallegos, A.F., Foxx, T.S. Los Alamos National Laboratory Report LA-UR-97-4732, Los Alamos, New Mexico, December 2, 1997

6) Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition. Barbour, M.T., Gerritsen, J., Synder, B.D., Stribling, J.B., EPA 841-B-99-002, U.S. Environmental Protection Agency; Office of Water; Washington, D.C., 1999. Available on-line at http://www.epa.gov/owowwtr1/monitoring/rbp/index.html

7) Biological criteria: Technical guidance for streams and small rivers (revised edition). Gibson, G.R., M.T. Barbour, J.B. Stribling, J. Gerritsen, and J.R. Karr, EPA 822-B-96-001, U.S. Environmental Protection Agency, Office of Water, Washington, D.C., 1996. Available on-line at http://www.epa.gov/ceisweb1/ceishome/atlas/bioindicators/tech_guidance.html

8) Stressor Identification Guidance Document. EPA 822-B-96-001, U.S. Environmental Protection Agency, Office of Water, Washington, D.C.. 1996. Available on-line at http://www.epa.gov/ost/biocriteria/stressors/stressorid.html

LAPSAR Meeting--March 6, 2002

- Discussion of the geomorphic approach, including:
- "basis for sediment package definition"
- "basis for determining extent of packages in the field"
- "evidence correlating contaminant concentrations with the defined sediment packages (the most important item)"

Why use a geomorphic approach?

- Present day contaminant concentrations and the future fate and transport of contaminants are strongly affected by geomorphic processes
  - Flooding and sediment transport
- Evaluating canyon bottoms from a geomorphic perspective provides the most robust foundation for understanding contamination
  - Present contaminant distribution
  - Temporal and spatial trends
    - ♦ Understanding what has happened provides a basis for understanding what will happen

Geomorphology

- "The study of landforms"
  - Includes evaluation of physical processes acting on the surface of the earth
- Physical processes
  - Runoff (flooding)
  - Erosion
  - Sediment transport and deposition
- Landforms
  - Stream channels
  - Floodplains
  - Terraces (pre-lab channels/floodplains)

Why use a "reach" approach?

- Premise is that detailed characterization of discrete reaches:
  - Provides information sufficient to:
    - Understand contaminant transport
    - Make decisions concerning need for remedial action
  - Is more efficient and cost effective, and provides higher quality data, than less-detailed characterization of entire length of canyons
- Premise accepted by NMED by approval of
  - Los Alamos/Pueblo Work Plan (1995)
  - Canyons Core Document (1997)

Why define different "sediment packages"?

- Contaminant concentrations in sediments in any part of a canyon can vary by many orders of magnitude

- Subdivision of sediments in the landscape (horizontally and vertically) is required to adequately evaluate and display variations in contamination
  - Basis for understanding how system works
  - Guides sampling and identifying potential risk

"sediment package"

- Geomorphic unit
  - Areas designated on geomorphic map that share certain characteristics
    - sediment facies, sediment age, contaminant levels
  - Includes multiple "polygons"

- Sediment facies
  - Sediment deposits with different particle size distribution
    - fine facies (suspended sediment, overbank settings)
    - coarse facies (bed load sediment, channels)

“basis for sediment package definition”

- **Differences in sediment age**
  - young vs. old (e.g., 1990s vs. 1950s)

- **Differences in sediment facies**
  - coarse vs. fine (e.g., coarse sand vs. silt)

- **Differences in contaminant levels**
  - high vs. low
    - field radiation measurements
    - fixed-lab analyses

“basis for determining extent of packages in the field”

- **Horizontal extent:**
  - Surface characteristics (e.g., bare / vegetated)
  - Topographic breaks
  - Contaminant levels
    - including presence/absence
  - Sediment / soil characteristics
    - Burial of trees or “A” horizons of soil?
- **Vertical extent:**
  - Observations of stratigraphy (stratified layers)
  - Contaminant levels
    - including presence/absence

“evidence correlating contamination with defined packages”

- Geomorphic units in part broken out specifically based on variations in contaminant concentrations
  - high vs. low gamma or alpha radiation
- Lab analyses used to confirm conceptual understanding that contaminants have affinity for fine-grained sediment particles
  - higher levels in fine facies than coarse facies
- Lab analyses used to evaluate differences in contamination as function of sediment age

Age of Sediments and Geomorphic Units

- Surface characteristics
  - bare = youngest, vegetated = older
- Aerial photographs (1935 to present)
- Tree age (dendrochronology: tree ring dating)
  - Sediment below base of tree older than tree
  - Sediment above base of tree younger than tree
- Isotopic ratios in sediment
  - e.g., Pu-238 releases increased ~1961
    - Pu-239,240/Pu-238 ratio drops
- Soil characteristics
  - dark "A" horizon = time break

TABLE B6-1

SUMMARY OF SEDIMENT SAMPLING EVENTS IN PUEBLO CANYON

Reach	Sampling Event	Sampling Dates	Number of Samples Collected*	Type of Analyses and Primary Goals
P-1	1	5/30/96	7	Full-suite analyses; determine contaminants present above background values and primary risk drivers; examine general variations in contaminants between geomorphic units
P-1	2	9/25/96	24	Plutonium analyses; evaluate vertical variations in plutonium activity; provide initial estimate of plutonium inventory
P-1	3	6/25/97	31	Plutonium analyses plus seven limited-suite analyses; reduce uncertainty in plutonium inventory; test adequacy of geomorphic unit designations; evaluate dispersion of plutonium on floodplains and contributions of mercury from P-1 West vs. Acid Canyon
P-2	1	9/29/97–9/30/97	48	Plutonium analyses; test adequacy of geomorphic unit designations; evaluate vertical variations in plutonium; provide initial estimate of plutonium inventory
P-2	2	11/24/97	26	Plutonium analyses plus eight limited-suite analyses; reduce uncertainty in plutonium inventory; test adequacy of geomorphic unit designations; evaluate vertical variations in plutonium and levels of other contaminants
P-2	3	2/2/98	4	Plutonium analyses from drill hole; evaluate vertical variations and vertical extent of plutonium below thick channel unit
P-3	0	8/18/97	5	Plutonium analyses from core from well PAO-1; evaluate vertical variations and vertical extent of plutonium
P-3	1	9/30/97–10/1/97	32	Plutonium analyses; test adequacy of geomorphic unit designations; evaluate vertical variations in plutonium; provide initial estimate of plutonium inventory
P-3	2	11/24/97–11/25/97	23	Plutonium analyses plus eight limited-suite analyses; reduce uncertainty in plutonium inventory; test adequacy of geomorphic unit designations; evaluate vertical variations in plutonium and levels of other contaminants
P-3	3	1/30/98, 2/3/98, 2/4/98, 2/10/98	8	Plutonium analyses from drill holes; evaluate vertical variations and vertical extent of plutonium below thick channel units
P-4	1	4/22/96	9	Full-suite analyses; determine contaminants present above background values and primary risk drivers; examine general variations in contaminants between geomorphic units
P-4	2	9/24/96	18	Plutonium analyses; evaluate vertical variations in plutonium activity, age trends in plutonium in channel facies deposits, and dispersion of plutonium on floodplains; provide initial estimate of plutonium inventory
P-4	3	5/13/97–5/14/97	43	Plutonium analyses plus one limited-suite analysis; reduce uncertainty in plutonium inventory; evaluate dispersion of plutonium on floodplains and vertical variations in plutonium activity; test adequacy of geomorphic unit designations; obtain limited-suite analysis from layer with highest plutonium activity
P-4	4	7/25/97	4	Plutonium analyses; examine vertical extent of plutonium in previously sampled sections
P-4	5	11/25/97	5	Plutonium analyses plus one limited-suite analysis; evaluate vertical variations in plutonium at site with highest plutonium activity; obtain limited-suite analysis from layer with highest plutonium activity

*Number of samples does not include quality assurance duplicates.

South Fork Acid Canyon Samples					
April 2000 Interim Report					
Unit	**Description**	**Area (m2)**	**% of Total Area**	**Number of Samples**	**% of Total Samples**
c1	active channel	401	37%	3	6%
c1b	recently abandoned channel	21	2%	1	2%
c2	older abandoned channel, low alpha (< 1000 pCi/g)	399	36%	16	33%
f1	floodplain, low alpha (< 1000 pCi/g)	223	20%	15	31%
c3	older abandoned channel, high alpha (> 1000 pCi/g)	17	2%	6	12%
f1a	floodplain, high alpha (> 1000 pCi/g)	36	3%	8	16%
	Total	**1097**	**100%**	**49**	**100%**

3/18/02

Draft Revised Sediment Eco-Screen

Objective: The purpose of this eco-screen is to assemble a list of COPECs [contaminants of potential ecological concern], receptors, and pathways. This information provides some of the basis for Step 3 of ERAGS [ecological risk assessment guidance for Superfund]. This document is not intended to be "stand-alone" rather it updates information provided in the reach reports. This document also illustrates the intended process to be applied to the final data sets for the LA/Pueblo Surface Aggregate Report.

Caveats: The sediment data represent a nearly complete set of compiled analytical results. Although these data have been compiled, the values and qualifiers have not been reconciled with focused data validation results from the reach reports and subsequent investigation phases. The verification samples for Reach ACS are not back from the analytical laboratory and are thus not included. Samples from the post-fire investigation at TA-2 are included but some of these samples are not canyons sediments, and will be removed once these locations are mapped relative to the extent of sediment deposits. Some locations were re-sampled to replace data with elevated detection limits or to address other specific data quality questions. The working data set includes both the original samples and the re-sample results. Some of the surface water and alluvial groundwater data for LA and Pueblo Canyons have been assembled, but these data are far from complete. The results of an initial eco-screen with these water data will also be discussed.

Working data set: This data set includes 1229 sediment samples [including some TA-2 that are likely not sediment] and 206 analytes. These samples include removed sediment in reach LA-2 and ACS, and the removed samples were included to initially identify COPCs. Because some analytes can be obtained from different analytical methods, the analyte names for these analytes included the method (e.g., SVOC for an organic from the semivolatile method). Seventy-nine analytes were not detected and are not considered further. The process and results for focusing the remaining COPCs to key COPECs is discussed below.

Focusing COPCs to key COPECs:

1) **Infrequently detected organics**: Fifty-seven organics were detected in less than 5% of the sample results [Table [1]1]. Five per cent is a level suggested by EPA and is commonly used to eliminate COPCs from further assessment. All organic suites had more than 20 sample results [except VOCs, dioxins, and PCB congeners]. One caveat is that the working data set includes samples that were intended to be replaced by later samples with better detection limits or to address other data quality problems. Thus, the frequency of detects may change in the final data set.

[1] One additional COPC, Aroclor-1248, was eliminated because it was not detected in any samples after the ACS removed sample results were eliminated from the assessment.

2) **Inorganics and radionuclides that are not different from background**: In the reach reports, inorganic and radionuclide sample results for each reach were compared to sediment background data. For this draft, revised screen a more simple approach was taken to evaluate the frequency of overall sample results [for the watershed] greater than the sediment BV and ratio of the maximum watershed sample result to the BV. Eleven inorganics and six radionuclides were eliminated as not being different from background across the watershed [<5% > BV and maximum/BV < 2, Table 2]. Statistical analyses will be used to compare inorganics and radionuclides in the final data set to background and determine which COPCs are greater than background.
3) **Comparison to ESLs**: ESLs have been developed for the aquatic communities associated with sediment and the terrestrial communities associated with soil. Some parts of these canyons have persistent or nearly persistent water that leads to an aquatic community. Other areas are dry except during periods of storm water runoff and do not have aquatic organisms except as transients washed during major floods. The LA and Pueblo reach reports did not evaluate possible adverse effects on aquatic organisms because sediment ESLs [aquatic pathways] were not available in 1998. The DP report included an assessment of aquatic receptor but only for segments of the canyon with persistent water and only for geomorphic deposits in routine contact with water [active channels or c1 units]. For this draft, revised eco-screen, all active channel geomorphic deposits were compared to ESLs developed for aquatic pathways. The maximum values for all other geomorphic deposits were compared to ESLs for terrestrial receptors. Only the maximum value for each COPC was evaluated to be consistent with the initial approach in the reach reports. One purpose of this protective screening assessment is to determine if the apparent risk drivers or potentially impacted species have changed since the reach reports were completed. Table 3 contains a summary of the results of the draft, revised eco-screen and shows that only 7 COPCs had a maximum sample result less than the appropriate ESLs and can be eliminated from further consideration.
4) **Calculation of HQ values**: Hazard quotients [HQ] are the ratio of the maximum concentration to the ESL. HQ is an indicator of possible adverse effects is the value is greater than 1. HQs can provide an indication of the key contaminants, pathways, and receptors. Because the maximum value is used in the HQ and for most species adverse ecological effects are managed at a population level, key COPECs are identified as having HQ>10. Another consideration in the use of HQ=10 as this may frequently be the dose associated with the lowest effect level for the ecotoxicity test organism [LOEAL to NOEAL uncertainty factor is often assumed to be 10]. For the kestrel with the flesh diet key COPECs are noted with HQ=1 because the kestrel represents T&E raptors. HQ results for terrestrial receptors are summarized in Table 4 and for aquatic receptors in Table 5.

Comparison to reach reports: Table 6 compares the key COPECs identified by the HQ analysis with the COPECs identified in the reach reports. Nine COPECs were added from the reach report list and 13 were dropped in the process outlined above. One COPC, cyanide was added due to detections > BV in the post-fire samples. Three of the COPECs added were due to exceedances of the aquatic community ESLs for organic chemicals.

Initial eco-screen for water data: A graphical comparison of the working water set maximum values to the final water ESL is provided in Figure 1. This analysis is preliminary due to the limited water data available, but it does suggest that adverse effects from water COPCs seem to be limited to the aquatic community [similar to the results for the sediment HQ analysis].

Spatial trends for selected key COPECs: Figure 2 provides the spatial trends for a representative COPEC for each analytical suite. The plots provide some information of the potential sources of each class of COPEC [LANL releases, townsite, Cerro Grande fire, background].

<u>Assessment endpoints, spatial scales, measures</u>:

Questions: Consider the following questions to develop assessment endpoints
(1) What are the valued entities of the watershed;
(2) What are the attributes of the entity at risk; and
(3) How will the attributes be measured and what are the potential uncertainties associated with these measures (measures of effect, measures of exposure, measures of receptor/ecosystem characteristics)?

Assessment endpoint description

Assessment endpoint attributes
Unambiguous operational definition
Societal relevance
Ecological relevance
Susceptibility to hazardous agent
Accessibility to prediction and measurement

Table 1. Infrequently detected organics in sediment

Suite	Analyte	overall w/o baseline			area detection frequency					
		count	detects	detect freq	Baseline*	Acid	DP	Upper LA	Lower LA	Pueblo
pest	BHC_alpha__	197	2	0.010	n/a	0.033	0.000	0.000	0.000	0.021
	BHC_delta__	197	1	0.005	n/a	0.000	0.000	0.000	0.000	0.021
	BHC_gamma__	197	2	0.010	n/a	0.033	0.000	0.000	0.000	0.021
	Endosulfan_II	197	1	0.005	n/a	0.000	0.000	0.013	0.000	0.000
	Endosulfan_Sulfate	197	2	0.010	n/a	0.000	0.000	0.025	0.000	0.000
	Endrin	197	3	0.015	n/a	0.000	0.000	0.038	0.000	0.000
svoc	Acenaphthylene	302	2	0.007	0.000	0.000	0.013	0.000	0.000	0.029
	Aniline	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Benzidine	109	1	0.009	n/a	0.000	0.023	0.000	n/a	0.000
	Benzyl_Alcohol	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Bis_2_chloroethoxy_methane	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Bis_2_chloroethyl_ether	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Chloroaniline_4__	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Chloronaphthalene_2__	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Chlorophenol_2__	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Chlorophenyl_phenyl_4___Ether	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Di_n_butylphthalate	300	4	0.013	0.000	0.000	0.013	0.020	0.000	0.000
	Di_n_octylphthalate	300	2	0.007	0.000	0.000	0.013	0.000	0.000	0.029
	Dichlorobenzene_1_2___SVOC	293	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Dichlorobenzene_1_3___SVOC	293	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Dichlorobenzene_1_4___SVOC	293	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Dichlorobenzidine_3_3___	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Diethylphthalate	300	2	0.007	0.000	0.000	0.013	0.007	0.000	0.000
	Dimethyl_Phthalate	300	2	0.007	0.000	0.000	0.027	0.000	0.000	0.000
	Dimethylphenol_2_4__	300	0	0.000	0.143	0.000	0.000	0.000	0.000	0.000
	Dinitro_2_methylphenol_4_6__	300	3	0.010	0.000	0.000	0.040	0.000	0.000	0.000
	Dinitrophenol_2_4__	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Dinitrotoluene_2_4__	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Dinitrotoluene_2_6__	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Hexachlorobutadiene	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Hexachlorocyclopentadiene	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Hexachloroethane	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Isophorone	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Methylphenol_2__	300	1	0.003	0.714	0.000	0.013	0.000	0.000	0.000
	Methylphenol_4__	300	3	0.010	1.000	0.000	0.013	0.013	0.000	0.000
	Nitroaniline_2__	300	2	0.007	0.000	0.000	0.027	0.000	0.000	0.000
	Nitroaniline_3__	294	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Nitroaniline_4__	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Nitrobenzene	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Nitrophenol_4__	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Nitroso_di_n_propylamine_N__	300	2	0.007	0.000	0.029	0.013	0.000	0.000	0.000
	Nitrosodimethylamine_N__	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Oxybis_1_chloropropane__2_2__	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Pentachlorophenol	300	2	0.007	0.000	0.000	0.027	0.000	0.000	0.000
	Phenol	300	5	0.017	1.000	0.000	0.013	0.027	0.000	0.000
	Pyridine	180	0	0.000	1.000	0.000	0.000	0.000	n/a	0.000
	Trichlorobenzene_1_2_4__	300	2	0.007	0.000	0.029	0.013	0.000	0.000	0.000
	Trichlorophenol_2_4_5__	300	1	0.003	0.000	0.000	0.013	0.000	0.000	0.000
	Trichlorophenol_2_4_6__	300	2	0.007	0.000	0.000	0.027	0.000	0.000	0.000
voc	Xylene__Total_	29	1	0.034	n/a	n/a	0.040	0.000	n/a	n/a

* baseline are post-fire samples collected at locations upstream of LANL releases

Table 2. Inorganics and radionuclides not different from sediment background

Suite	Analyte	overall w/o baseline					area frequency > BV					
		BV	count	count> BV	freq> BV	max/BV	baseline*	ac	dp	ula	lla	pc
inorg	Aluminum	15400	394	1	0.003	1.19	0.286	0.000	0.000	0.000	0.000	0.009
	Beryllium	1.31	394	10	0.025	1.53	0.000	0.048	0.015	0.036	0.000	0.019
	Bicarbonate_ as_CaCO3_	n/a	0	0	n/a	n/a	1.000	n/a	n/a	n/a	n/a	n/a
	Bromide	n/a	0	0	n/a	n/a	1.000	n/a	n/a	n/a	n/a	n/a
	Chloride	17.1	0	0	n/a	0.00	1.000	n/a	n/a	n/a	n/a	n/a
	Iron	13800	394	7	0.018	2.65	0.286	0.000	0.000	0.022	0.000	0.037
	Magnesium	2370	394	5	0.013	1.31	0.714	0.000	0.000	0.022	0.025	0.009
	Potassium	2690	394	2	0.005	1.39	0.571	0.000	0.000	0.000	0.025	0.009
	Sodium	1470	394	1	0.003	1.04	0.000	0.000	0.000	0.000	0.025	0.000
	Sulfate	58.2	0	0	n/a	0.00	1.000	n/a	n/a	n/a	n/a	n/a
	Vanadium	19.7	394	12	0.030	1.22	0.286	0.071	0.000	0.022	0.050	0.037
rad	Protactinium_233	n/a	2	0	0.000	n/a	n/a	n/a	0.000	n/a	n/a	
	Radium-226	2.59	2	0	0.000	0.14	n/a	n/a	n/a	0.000	n/a	n/a
	Thorium_227	n/a	14	14	1.000	n/a	n/a	n/a	n/a	n/a	1.000	1.000
	Thorium_228	2.28	55	1	0.018	1.27	0.000	n/a	0.000	0.059	0.000	0.000
	Thorium_230	2.29	55	2	0.036	1.14	0.000	n/a	0.000	0.118	0.000	0.000
	Thorium_232	2.33	55	1	0.018	1.13	0.000	n/a	0.000	0.059	0.000	0.000

* baseline are post-fire samples collected at locations upstream of LANL releases

Table 3. Screening of COPCs vs ESLs based on maximum values in sediment.

suite	name	group
inorg	Boron	<ESLs for terrestrial and aquatic receptors
	Nickel	
	Total_Uranium_by_ICPMS	
pah	Benzo_g_h_i_perylene	
	Benzo_k_fluoranthene	
	Dibenz_a_h_anthracene	
	Fluoranthene	
	Methylnaphthalene_2__	
pest	Dieldrin	
rad	Cesium_134	
	Cobalt_60	
	Sodium_22	
	Tritium	
svoc	Butylbenzylphthalate	
	Dibenzofuran	
voc	Acetone	
	Methylene_Chloride	
	Toluene	
pah	Anthracene	>ESLs for aquatic, <ESLs for terrestrial
	Benzo_a_pyrene	
	Benzo_b_fluoranthene	
	Indeno_1_2_3_cd_pyrene	
	Phenanthrene	
	Pyrene	
pest	Chlordane_alpha__	
	Chlordane_gamma__	
rad	Americium_241	
	Cesium_137	
	Europium_152	
	Plutonium_238	
	Strontium_90	
	Uranium_234	
	Uranium_235	
	Uranium_235_GS	
	Uranium_238	
svoc	Benzoic_Acid	
inorg	Cadmium	<ESLs for aquatic, >ESLs for terrestrial
	Chromium__Total	
	Copper	
	Mercury	
	Methylmercury__1__Ion	
	Uranium	
pah	Acenaphthene	
	Fluorene	
	Naphthalene	
pcb	Aroclor_1254	
	Aroclor_1260	
pest	DDE_4_4__	
	Endrin_Aldehyde	
	Heptachlor_Epoxide	
svoc	Bis_2_ethylhexyl_phthalate	

Table 3 (cont.). Screening of COPCs vs ESLs based on maximum values in sediment.

suite	name	group
inorg	Antimony	>ESLs for both aquatic and terrestrial
	Arsenic	
	Barium	
	Cobalt	
	Cyanide__Total	
	Lead	
	Manganese	
	Selenium	
	Silver	
	Thallium	
	Titanium	
	Zinc	
pah	Benzo_a_anthracene	
	Chrysene	
pest	DDT_4_4__	
rad	Americium_241_GS	
	Plutonium_239	
inorg	Calcium	ESLs not available
pest	Aldrin	
	DDD_4_4__	
rad	Ruthenium_106	
svoc	Carbazole	
voc	Butylbenzene_sec__	
	Carbon_Disulfide	
	Ethylbenzene	
	Propylbenzene_1__	
	Styrene	
	Trichlorofluoromethane	
	Trimethylbenzene_1_2_4__	

Table 4. HQ values for terrestrial receptors [from exposure to sediment]

Group	Analyte name	All non- c1 sample results		HQ based on maximum										
		median	max-imum	Kestrel	Robin 50:50	Robin herb	Kestrel flesh	Robin invert	Desert cottontail	Deer mouse	Red fox	Vagrant shrew	Invert	Plant
inorg	Antimony	nd	3.15	n/a	n/a	n/a	n/a	n/a	0.508	3.150	0.032	5.526	n/a	63
	Arsenic	1.8	8.7	0.062	0.272	0.458	0.004	0.087	0.414	5.118	0.090	10	1.279	0.870
	Barium	59.8	280	0.165	0.737	1.217	0.006	0.280	8.235	62	0.667	120	n/a	2.800
	Cadmium	nd	3.3	0.660	2.538	4.648	0.005	0.375	0.118	2.063	0.004	3.793	33	3.3
	Chromium__Total	5.7	240	0.045	0.436	0.522	0.018	0.353	0.030	0.114	0.013	0.343	170	100
	Cobalt	2.5	8.6	23	92	170	[illegible]	19	1.720	45	0.860	95	n/a	34
	Copper	7.3	64	0.019	0.206	0.164	0.003	0.246	0.213	0.376	0.007	0.376	4.923	6.400
	Cyanide__Total	nd	2	3.279	20	20	[illegible]	20	0.003	0.006	0.000	0.006	n/a	n/a
	Lead	20.9	207	0.414	2.875	3.764	0.077	2.070	0.223	0.941	0.045	2.070	0.104	0.460
	Manganese	256	1500	0.047	0.357	0.395	0.005	0.326	0.882	2.083	0.044	2.885	n/a	30
	Mercury	0.028	3.4	0.121	0.654	0.919	0.047	0.378	0.001	0.008	0.001	0.018	68	0.100
	Methylmercury__1__Ion	0.000184	0.002	0.952	2.817	5.714	0.263	0.027	0.001	0.317	0.024	0.645	0.001	n/a
	Selenium	0.172	1.5	0.179	0.750	1.364	0.011	0.150	0.027	0.789	0.014	1.648	0.195	15.000
	Silver	nd	15.8	0.158	0.832	1.129	0.007	0.527	30	110	1.129	170	n/a	320
	Thallium	nd	6.7	n/a	n/a	n/a	n/a	n/a	0.239	9.853	0.239	21	n/a	67
	Titanium	173	1840	n/a	n/a	n/a	n/a	n/a	0.312	12	0.252	26	n/a	n/a
	Uranium	4.655	41	0.273	1.139	2.050	0.011	0.216	0.021	0.707	0.009	1.519	n/a	1.640
	Zinc	40	390	0.591	3.000	4.021	0.080	1.857	0.355	1.219	0.028	1.696	1.114	39
pah	Acenaphthene	nd	1.6	n/a	n/a	n/a	n/a	n/a	0.001	0.006	0.000	0.010	n/a	6.400
	Benzo_a_anthracene	nd	5.6	n/a	n/a	n/a	n/a	n/a	0.467	1.143	0.175	1.867	n/a	0.311
	Chrysene	nd	5.3	n/a	n/a	n/a	n/a	n/a	0.442	1.293	0.212	2.208	n/a	n/a
	Fluorene	nd	1.8	n/a	n/a	n/a	n/a	n/a	0.001	0.004	0.000	0.006	1.059	n/a
	Naphthalene	nd	2.4	1.846	9.600	12	0.200	7.059	0.005	0.014	0.000	0.020	n/a	n/a
pcb	Aroclor_1254	nd	6.2	36	78	150	28	4.429	2.214	140	41	280	n/a	0.620
	Aroclor_1260	nd	1	0.556	1.163	2.273	0.455	0.067	0.002	0.100	0.031	0.200	n/a	n/a
pest	DDE_4_4___	nd	0.03	3.614	5.769	12	[illegible]	0.231	0.000	0.002	0.001	0.005	n/a	n/a
	DDT_4_4___	0.00695	0.14	15	27	54	15	1.167	0.001	0.067	0.030	0.140	n/a	0.038
	Endrin_Aldehyde	nd	0.057	0.826	2.714	5.182	0.356	0.671	0.014	0.158	0.017	0.300	n/a	17
	Heptachlor_Epoxide	nd	0.11	0.092	0.183	0.367	0.085	0.008	0.011	1.000	0.333	1.864	n/a	0.275
rad	Americium_241_GS	0.198	88	0.003	0.022	0.022	0.001	0.007	0.003	0.003	0.003	0.003	2.000	0.004
	Plutonium_239	1.3	502.01	0.015	0.239	0.239	0.003	0.058	0.003	0.003	0.015	0.005	11	0.003
svoc	Bis_2_ethylhexyl_phthalate	nd	2	0.870	1.053	2.000	[illegible]	0.087	0.001	0.033	0.031	0.067	n/a	n/a

nd = non-detect, n/a = ESL is not available for this receptor, black cells show HQ>10 [or >LOEAL], gray cells show HQ>1 [T&E species]

Table 5. HQ values for aquatic pathways from exposure to sediment

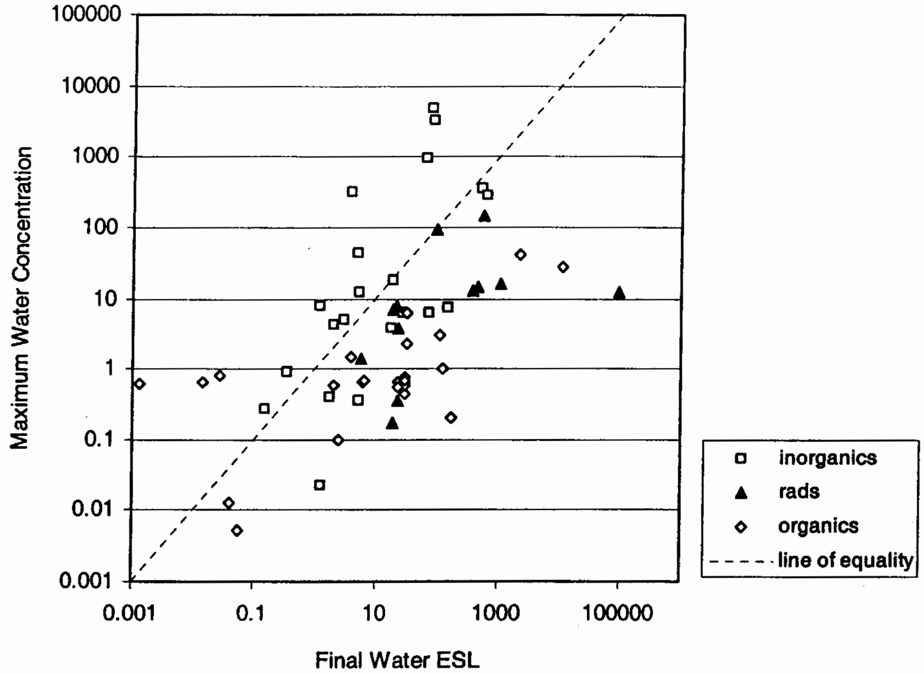
Group	Analyte name	All c1 sample results		HQ based on maximum		
		median	maximum	Bat	Swallow	Aq. Comm
inorg	Antimony	nd	1.2	1.54	n/a	0.40
	Arsenic	0.95	5	4.55	0.17	0.42
	Barium	27.1	370	110	1.09	7.71
	Cobalt	1.6	8.1	68	110	n/a
	Cyanide__Total	nd	2.5	0.01	18	25
	Lead	12.2	107	0.54	0.97	3.15
	Manganese	161	2100	2.47	0.31	2.92
	Selenium	nd	1.7	1.42	1.06	1.70
	Silver	nd	0.36 *	3.00	0.02	0.36
	Thallium	nd	0.86	1.95	n/a	n/a
	Titanium	216	409 *	4.17	n/a	n/a
	Zinc	37	140	0.48	1.08	0.93
pah	Anthracene	nd	0.069	<0.01	n/a	180
	Benzo_a_anthracene	nd	1.2	0.20	n/a	11
	Benzo_a_pyrene	nd	0.74	0.05	n/a	2.11
	Benzo_b_fluoranthene	nd	1.7	0.03	n/a	7.08
	Chrysene	nd	0.99	0.23	n/a	1.98
	Indeno_1_2_3_cd_pyrene	nd	0.55	0.01	n/a	7.05
	Phenanthrene	nd	2.7	0.19	n/a	3.18
	Pyrene	nd	3.6	0.18	n/a	6.32
pest	Chlordane_alpha__	nd	0.0018	<0.01	<0.01	3.60
	Chlordane_gamma__	nd	0.0031	<0.01	<0.01	6.20
	DDT_4_4__	nd	0.00599	<0.01	1.71	3.99
rad	Americium_241	0.035	0.64	<0.01	<0.01	3.76
	Americium_241_GS	0.0255	1	<0.01	<0.01	5.88
	Cesium_137	0.26	6.27	<0.01	0.01	5.70
	Europium_152	0.094	0.408	0.01	0.02	2.40
	Plutonium_238	0.008	0.086	<0.01	<0.01	1.25
	Plutonium_239	0.354	14.74	0.12	0.13	200
	Strontium_90	0.245	1.39	0.01	0.01	0.08
	Uranium_234	0.648	1.68 *	<0.01	<0.01	43
	Uranium_235	0.04	0.133 *	<0.01	<0.01	3.09
	Uranium_235_GS	0.0575	0.1219 *	<0.01	<0.01	2.83
	Uranium_238	0.539	1.69 *	<0.01	<0.01	38
svoc	Benzoic_Acid	nd	0.75	0.05	n/a	12

nd = non-detect, n/a = ESL is not available for this receptor, black cells show HQ>10 [or >LOEAL]
* < background value, not a COPC in c1 geomorphic deposits

Table 6. Comparison of COPECs from reach reports to draft revised screen

Group	Analyte name +	Reach report results				Key COPECS in Revised screen *
		Pueblo	Upper LA	Lower LA	DP	
Inorg	Antimony	Soil	Soil	Soil	Soil	Soil
	Arsenic					Soil
	Barium				Water	Soil, sed
	Cadmium					Soil
	Calcium				Soil, sed, water	
	Chromium, total		Soil			Soil
	Cobalt					Soil, sed
	Cyanide					Soil, sed
	Iron				Water	
	Lead	Soil	Soil		Soil, sed	
	Lithium				Water	
	Manganese				Water	Soil
	Mercury	Soil	Soil		Soil	Soil
	Selenium	Soil			Soil	Soil
	Silver					Soil
	Thallium					Soil
	Vanadium			Soil		
	Zinc	Soil	Soil		Soil	Soil
PCBs	Aroclor-1254	Soil	Soil			Soil
	Aroclor-1260		Soil		Soil	
Pest	DDT+metabolites	Soil	Soil	Soil	Soil	Soil
	Heptachlor epoxide				Soil	
PAHs	Anthracene					Sed
	Benzo(a)anthracene					Sed
	Benzo(a)pyrene				Soil, sed	
	Naphthalene				Soil	Soil
SVOCs	BEHP	Soil			Soil, sed, water	Soil
	Benzoic acid					Sed
	Carbazole				Soil	
	Di-n-butylphalate				Soil	
	2,4,6-Trichlorophenol				Soil	
Rads	Cesium-137		Soil			
	Plutonium-239,240	Soil				Soil, sed
	Isotopic uranium		Soil			

+ black shaded cells indicate analytes added to draft revised screen; gray shaded cells indicate analytes eliminated in the draft revised



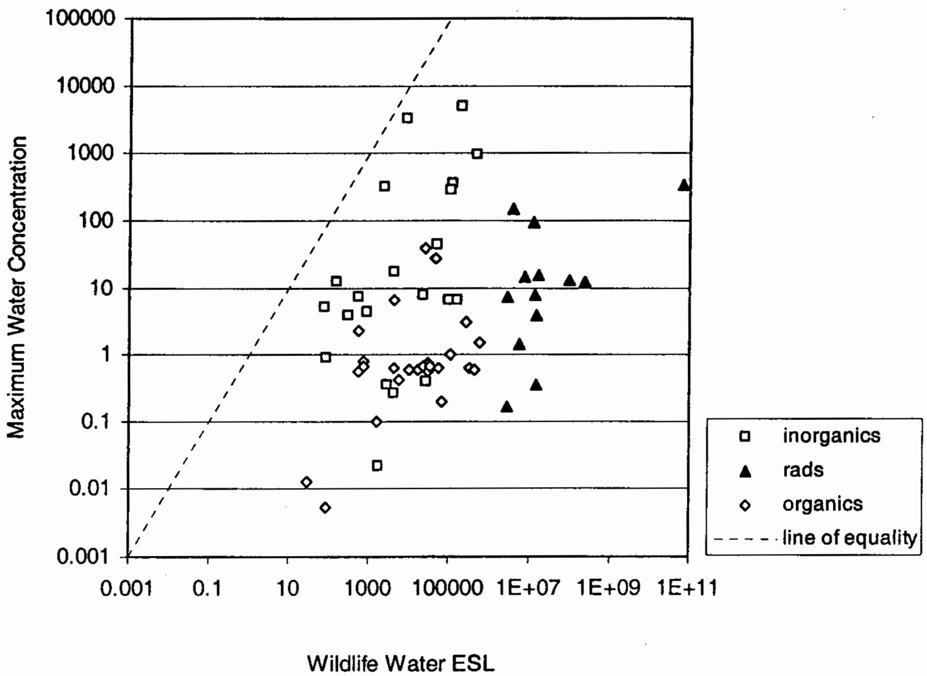


Figure 1. Initial draft eco-screen of the working water data. Top graph is the final water ESL for all receptors [wildlife drinking water and aquatic community]. Bottom graph is for the wildlife drinking water pathway for inorganics.

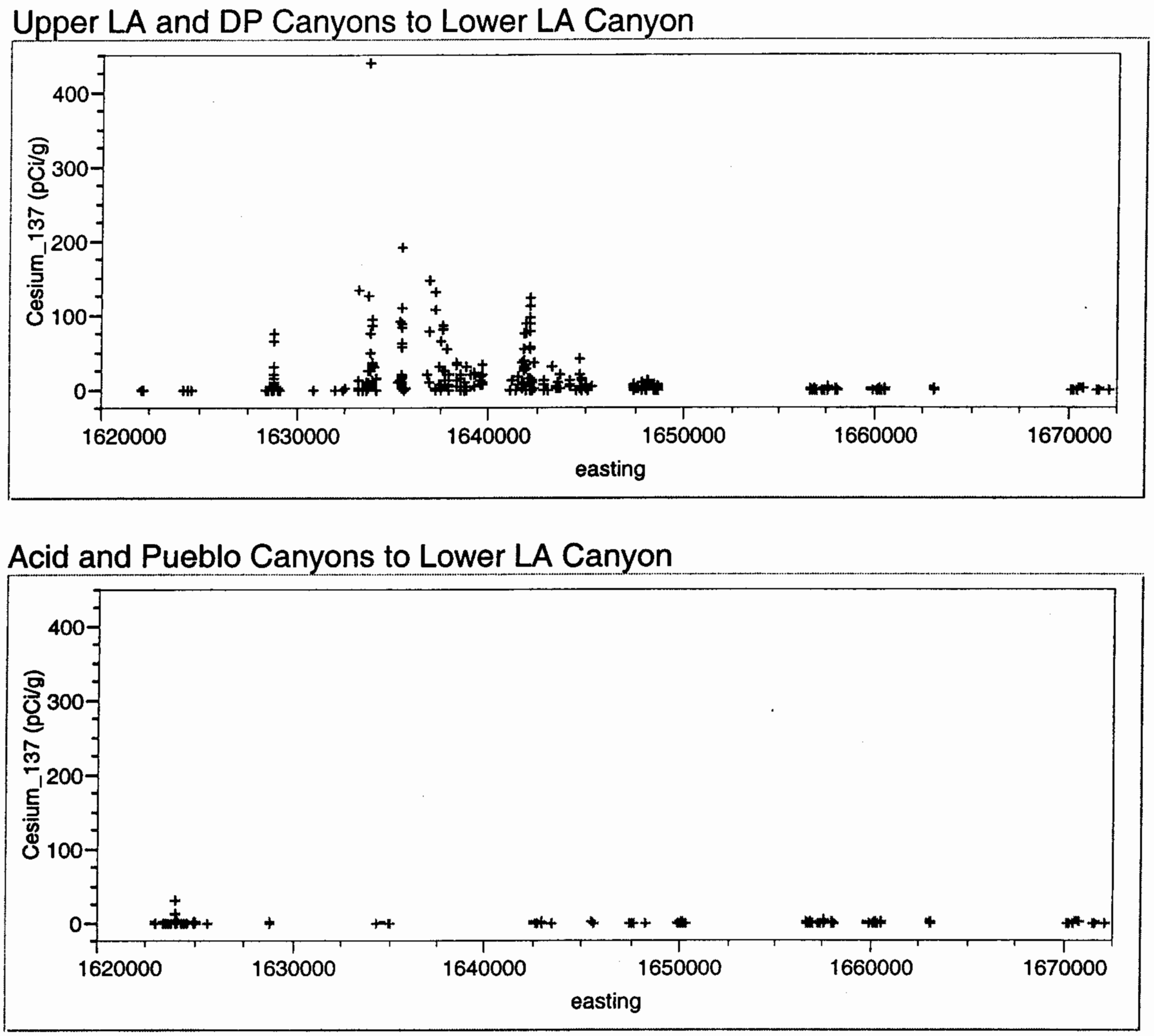
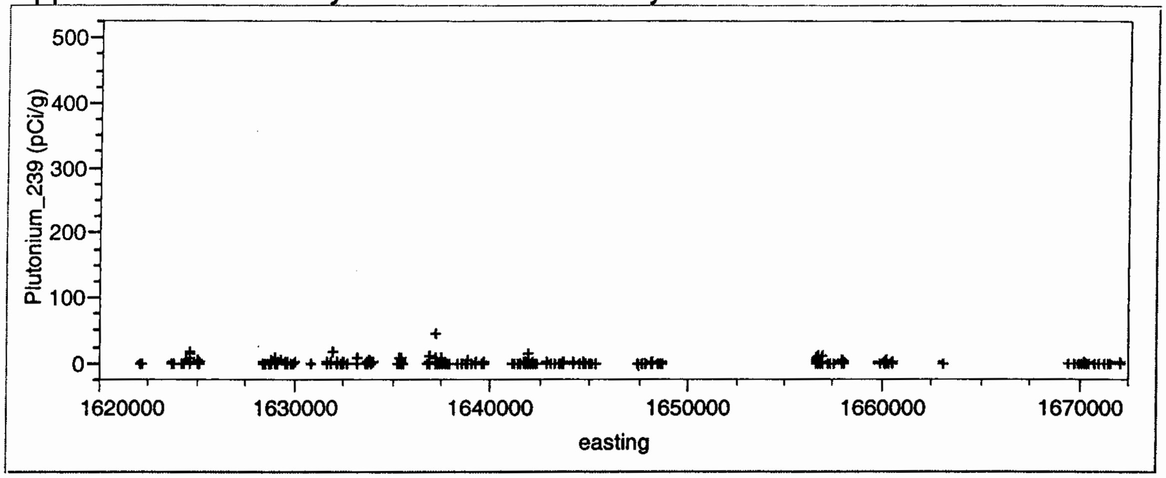


Figure 2. Spatial trends for selected COPECs [easting is used as a surrogate as distance from Rio Grande]

Upper LA and DP Canyons to Lower LA Canyon



Acid and Pueblo Canyons to Lower LA Canyon

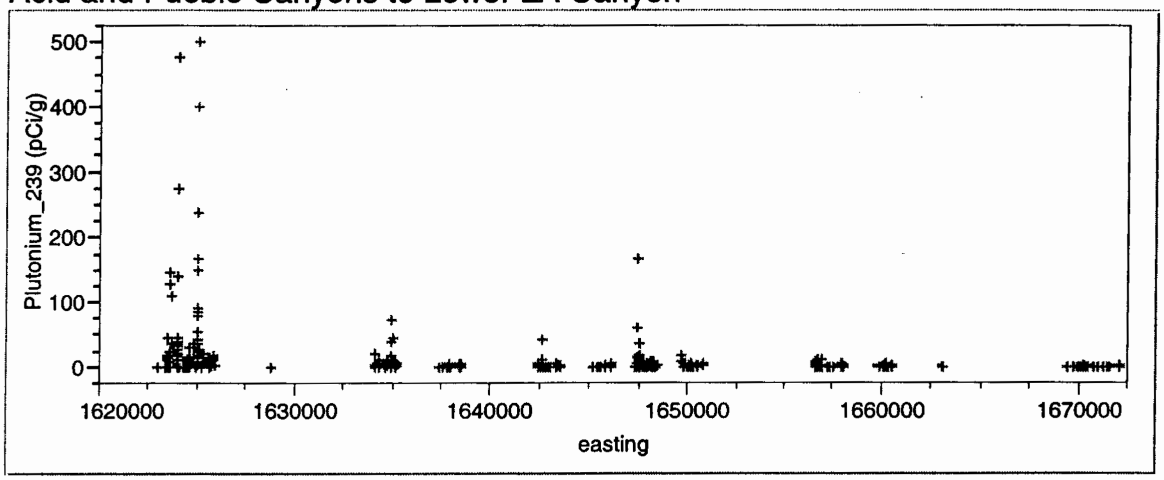
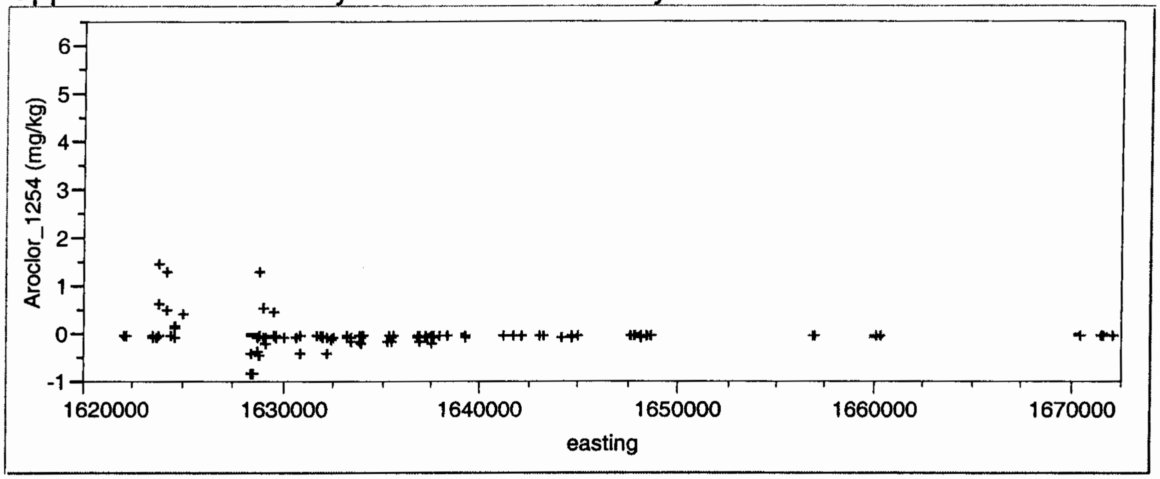


Figure 2 (cont.). Spatial trends for selected COPECs [easting is used as a surrogate as distance from Rio Grande]

Upper LA and DP Canyons to Lower LA Canyon



Acid and Pueblo Canyons to Lower LA Canyon

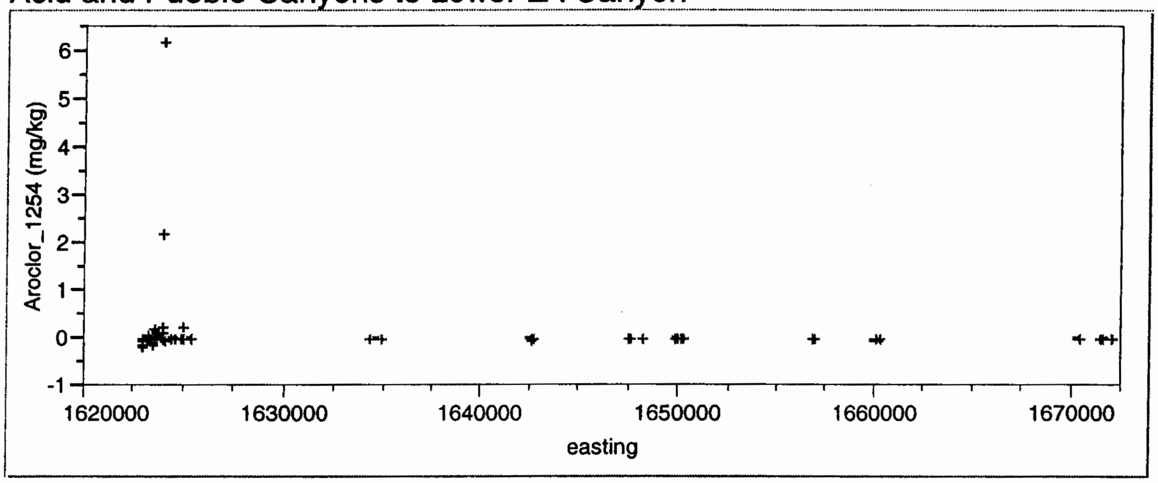
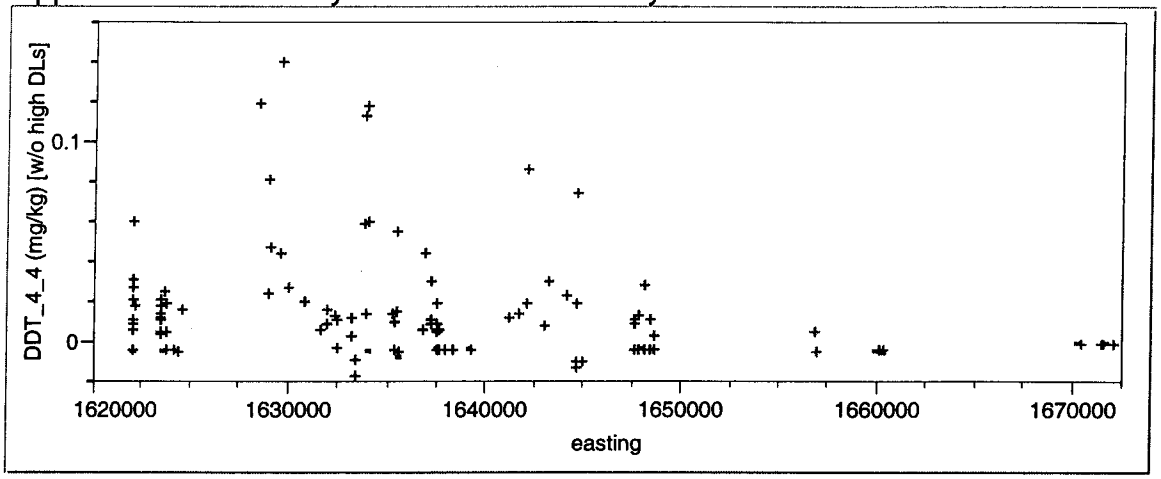


Figure 2 (cont.). Spatial trends for selected COPECs [easting is used as a surrogate as distance from Rio Grande]

Upper LA and DP Canyons to Lower LA Canyon



Acid and Pueblo Canyons to Lower LA Canyon

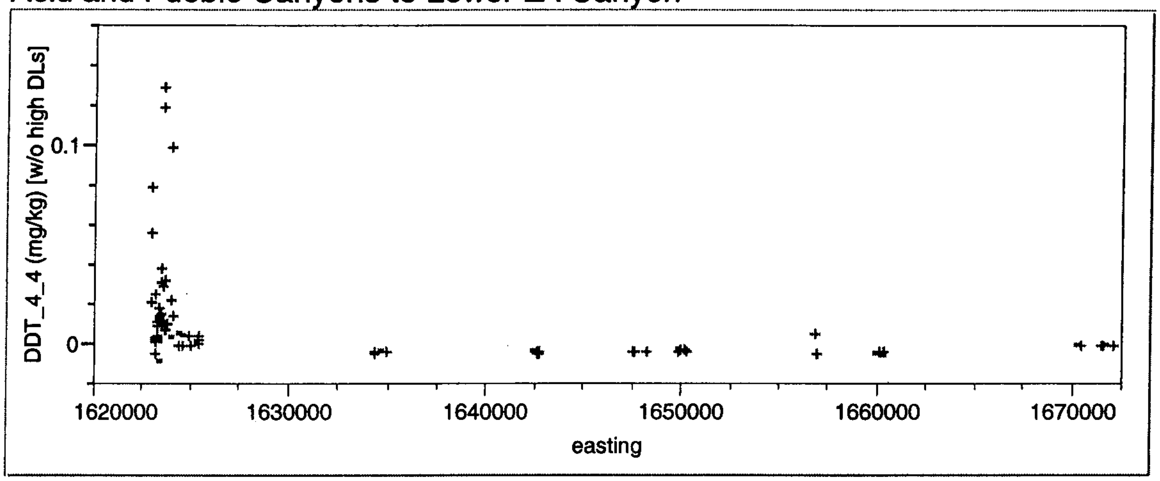
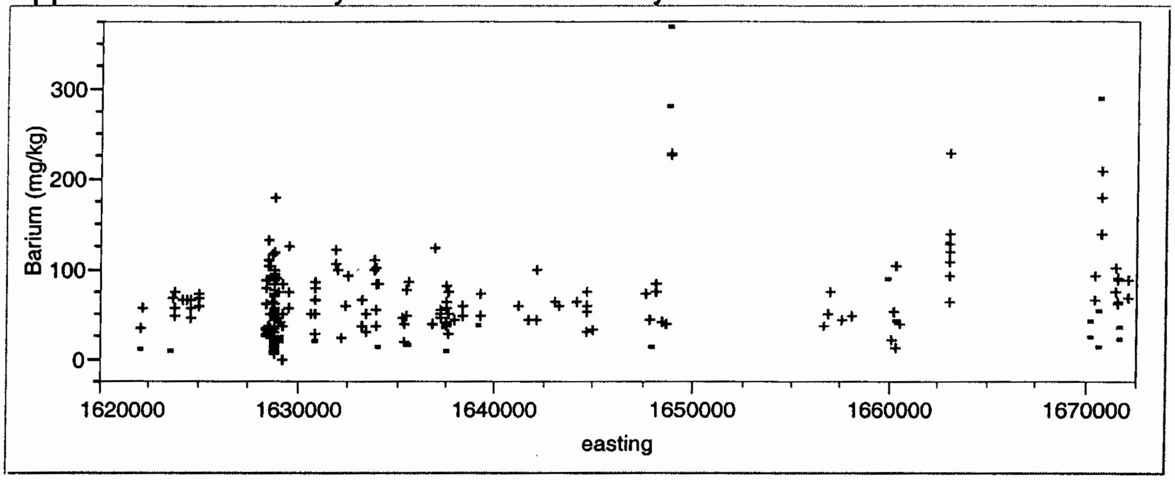


Figure 2. Spatial trends for selected COPECs [easting is used as a surrogate as distance from Rio Grande]

Upper LA and DP Canyons to Lower LA Canyon



Acid and Pueblo Canyons to Lower LA Canyon

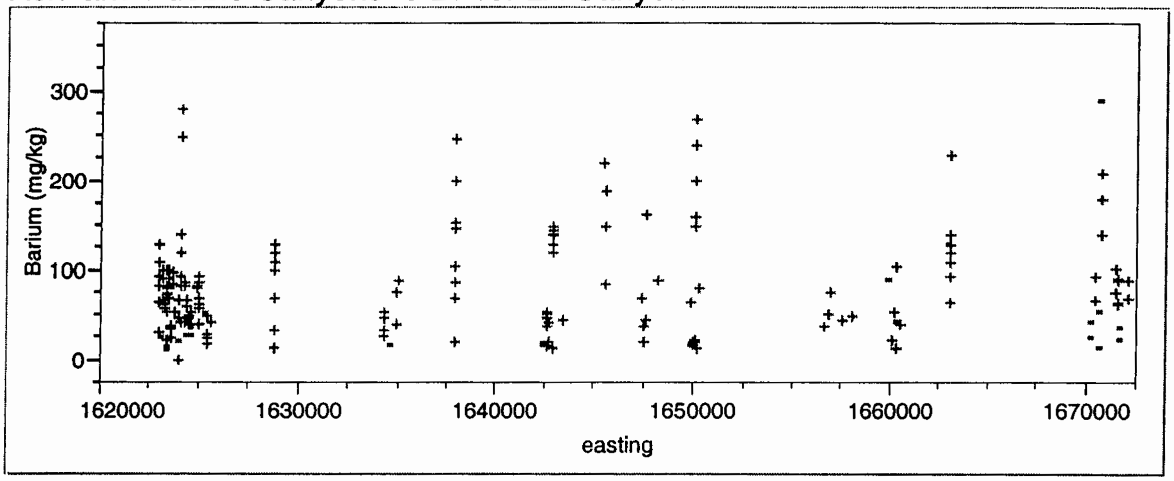
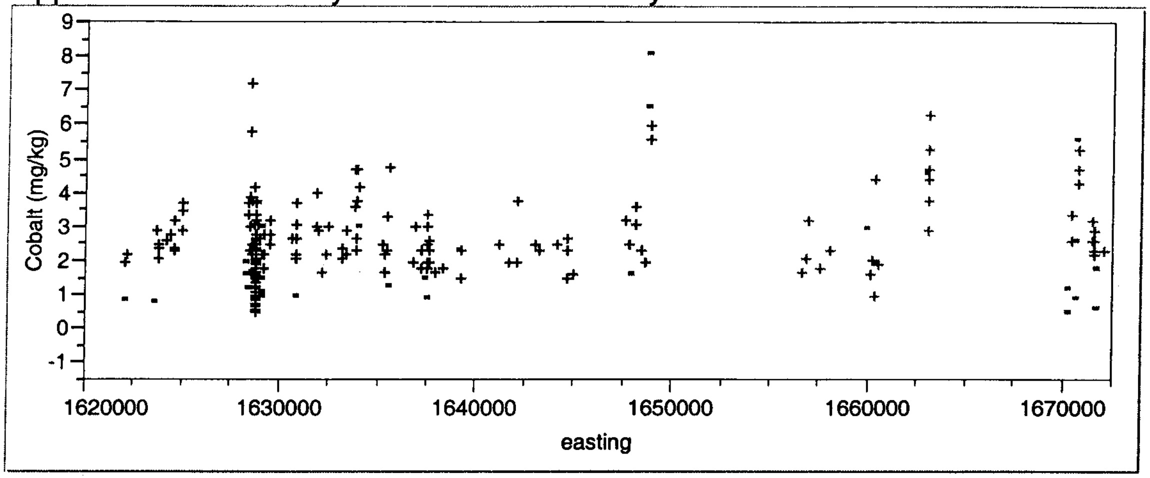


Figure 2. Spatial trends for selected COPECs [easting is used as a surrogate as distance from Rio Grande]

Upper LA and DP Canyons to Lower LA Canyon



Acid and Pueblo Canyons to Lower LA Canyon

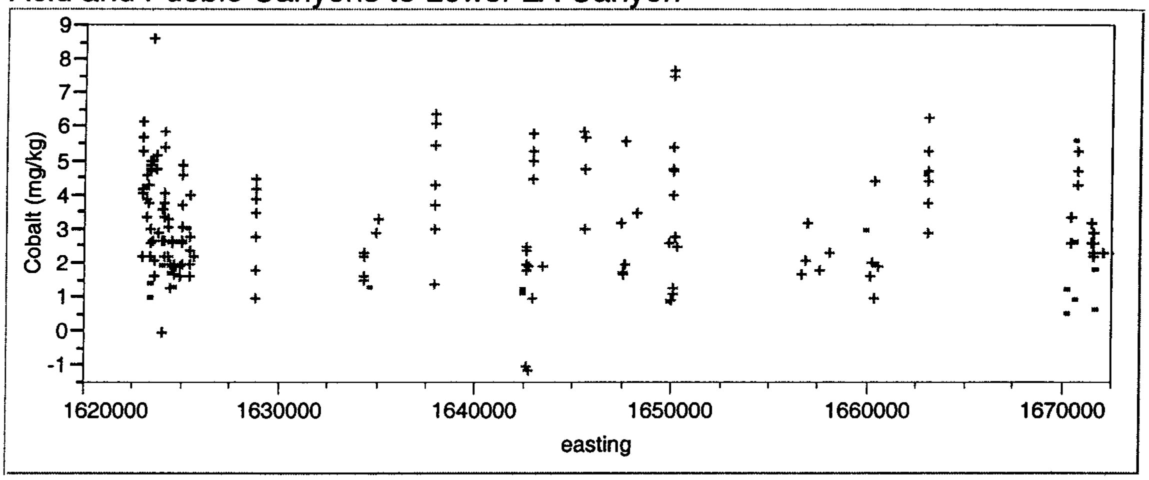


Figure 2. Spatial trends for selected COPECs [easting is used as a surrogate as distance from Rio Grande]

LAPSAR Meeting

3/18/02

Problem Formulation

Near term objectives

- **Complete steps 3 and 4 of ERAGS**
  - **Leading to an addendum to the LA/Pueblo Work Plan to address biota "sampling"**
- **Assumption: eco-screen in the reach reports provides enough information to advance to ERAGS step 3**

ERAGS = Ecological Risk Assessment Guidance for Superfund

Agenda

- ERAGS overview
- Reach reports assessments
- Problem formulation
  - Updated screening assessment
  - Refining COPECs
  - Spatial scales, exposure pathways, and receptors potentially at risk
  - Start discussion of assessment endpoints and associated measures

ERAGS = Ecological Risk Assessment Guidance for Superfund

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Ecological Risk Assessment Guidance for Superfund (ERAGS) Steps

Step 1: Screening-level problem formulation
Step 2: Screening-level exposure estimate
Step 3: Problem formulation
Step 4: Study design/Data Quality Objectives
Step 5: Field verification
Step 6: Site investigation
Step 7: Risk characterization
Step 8: Risk management

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Assessment Endpoints

- Formal expressions of the actual environmental value that is to be protected
- Key questions -
  - What are the valued entities at my site?
  - What are the attributes of the entity that are at risk?
  - How will the attributes be measured and what uncertainties exist?
- Are the right people and/or groups represented to answer these questions?

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Assessment Endpoints: Selection Criteria

- Unambiguous operational definition
- Societal relevance
- Ecological relevance
- Susceptibility to hazardous agent
- Accessibility to prediction and measurement

Examples:
1) spotted owl {entity} individual reproduction {attribute}
2) aquatic community {entity} diversity {attribute}

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Measures

- Originally referred to as measurement endpoints
  - Measurement endpoints focused on measures of effect
- Did not include other important considerations
  - Measures of ecosystem and receptor characteristics
  - Measures of exposure
- Consequently, term "measures of effect" replaced "measurement endpoint"

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Measures: Selection Criteria

- Appropriate to exposure route
- Appropriate to the scale of stressor
- Low natural variability
- Diagnostic
- Broadly applicable
- Standardized

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Measures: Selection Criteria

- Appropriate to exposure route
  - Organisms or communities measured should be exposed to stressor
  - Should also have same route of exposure (pathway by which stressor reaches receptor) in same proportion as assessment endpoints

Measures: Selection Criteria

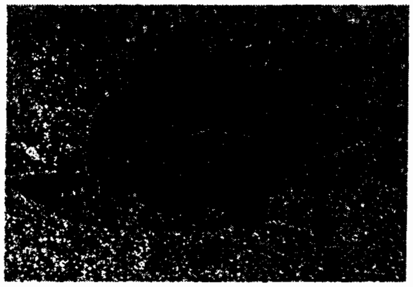
- Appropriate to scale of stressor
  - Impact may not be apparent at a given spatial scale
  - Impact may not be apparent in given study interval (assessments typically last 1-2 years)

Measures: Selection Criteria

Temporal scale example

Desert Tortoise
Xerobates* [*Gopherus*] *agassizii

Camel Cricket
***Ceuthophilus* sp.**



Population-based effects from contamination may be more readily observed in short-lived organisms (e.g., camel crickets) than in long-lived organisms (e.g., desert tortoise).

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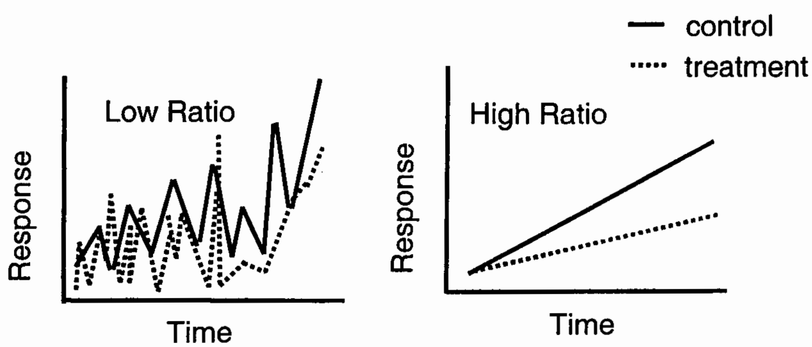
Measures: Selection Criteria

low natural variability

Highly variable responses among individuals or across space/time have low signal to noise ratios



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Measures: Selection Criteria

diagnostic

Strength of causal relationship is enhanced to the extent that measure is diagnostic

For example:

- Biomarkers
- Gross pathology

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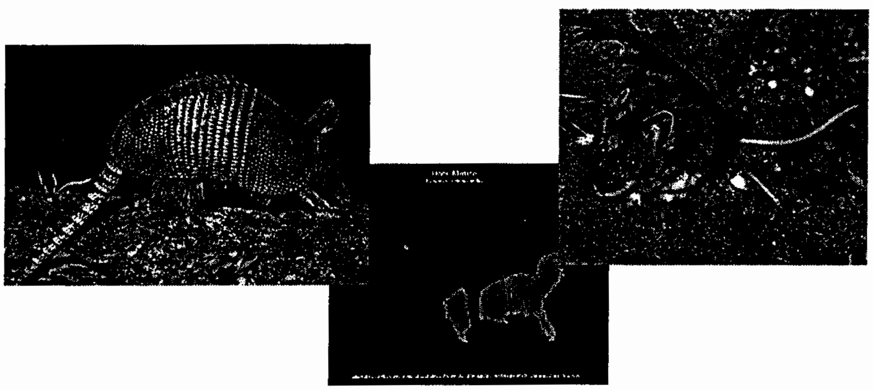
Measures: Selection Criteria

broadly applicable

Allows for precise comparisons among sites or tests



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Measures: Selection Criteria

- ❑ standardized
  - Regulatory acceptance
  - Large database for comparison
  - Well-developed, peer-reviewed protocols

Reach Report Assessments

- ❑ Based on COPCs (chemicals of potential concern) identified in each reach
- ❑ Pueblo, upper LA, and lower LA – screening based on terrestrial receptors only
  - Evaluated maximum value for reaches in report
- ❑ DP – based on both terrestrial and aquatic
  - Evaluated maximum value and average concentrations for DP Canyon
  - Evaluated aquatic pathways in areas of canyon with water present more than 25% of the time
  - Water data set did not include bedrock pools

Refining COPECs

- ❑ Detection frequency (<5% per RAGS)
  - Consideration of detection limits
- ❑ Background or baseline comparisons
- ❑ Comparison to ESLs
  - Maxima vs central tendency
  - Aquatic and terrestrial screening
- ❑ Key COPECs
  - Hazard Quotient > 10 for all receptors except kestrel (flesh) as surrogate for T&E species
  - Protective at LOEAL concentration as more representative of potential population level effects

Detection Frequency

- ❑ Sediment working data set
  - 1229 samples [includes TA-2 samples likely not sediment, reach LA-2 and ACS removed samples to identify COPCs]
  - 79 analytes never detected
- ❑ Eliminated organics detected in <5% of the samples
  - level suggested by EPA and is commonly used to eliminate COPCs from further assessment
  - 50 analytes detected <5% of samples [and <5% in major canyon areas]
- ❑ Eliminated TPH, TOC, and stoddard solvent

Sediment Background or Baseline

- Inorganics and radionuclides were identified as COPCs using statistical tests in the reach reports
- A simplified comparison of the frequency of values > background value and ratio of maximum to background value was used
  - Eliminated 11 inorganics
  - Eliminated 6 radionuclides
- Eliminated gross alpha, beta, gamma

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Comparison of Sediment Data to ESLs

- Did not consider dioxin data [only collected post-fire] or PCB congener data [limited data set collected to address PCB sources]
- Excluded removed samples in reach LA-2 and ACS
- Evaluated 81 analytes in sediment
- Evaluated active channel for aquatic receptors
  - Aquatic community, bat, swallow
- Evaluated other geomorphic units for terrestrial receptors
  - Plant, invert, mouse, shrew, cottontail, fox, robin (3), kestrel (2)

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Key COPECs

- ❑ Evaluated Hazard Quotient (HQ) for aquatic and terrestrial screening receptors
  - HQ is ratio of concentration to ESL [or ecological screening level]
  - Used maximum concentration [median for comparison]
  - HQ > 1 for adverse effects on individual [for kestrel with flesh diet as surrogate for T&E]
  - HQ > 10 for adverse effects on population [assumes HQ=10 is associated with Lowest Observed Adverse Effect Level or LOAEL]

Nature and Sources for Key COPECs

- ❑ LANL
- ❑ Town site
- ❑ Cerro Grande fire
- ❑ Combination

Screening Receptor Home Range Areas

- **Robin - 0.42 ha**
- **Spotted owl – 366 ha**
- **Kestrel - 13.1 ha**
- **Deer Mouse - 0.075 ha**
- **Rabbit - 1.5 ha**
- **Shrew - 0.39 ha**
- **Fox – 699 ha**

For comparison, approximate areas of sediment deposits are
Upper LA - 5 ha, DP - 2 ha, Lower LA – 28 ha
Pueblo - 30 ha, Acid - 1 ha

Subject: **LAPSAR notes**
Date: Wed, 27 Mar 2002 17:41:27 -0700
From: Randall Ryti <rryti@neptuneandco.com>
To: kirby olson <kirby_olson@nmenv.state.nm.us>
CC: katzman@lanl.gov, sreneau@lanl.gov, Mark Tardiff <mtardiff@neptuneandco.com>, Rich Mirenda <rmirenda@lanl.gov>

Kirby,

Here are my notes from our last LAPSAR meeting. Feel free to modify them. We can distribute the revised version at the meeting.

Also as I mentioned earlier today, we can discuss criteria for retaining COPECs at our meeting tomorrow. A couple of criteria are the source (LANL historical releases, Cerro Grande fire, town site) and the ubiquitousness of exceedances of ESLs or BVs. We can look at what receptors have HQs >1 and look at home range [area use] adjustments at the same time. Please think about other criteria for retaining COPECs.

My plan is that we would consider all of the COPECs identified in the terrestrial screen tomorrow and decide on which should be retained. If we complete that task and have time left we can start on assessment endpoints. In the next meeting we could complete the assessment endpoints for terrestrial and move to terrestrial measures. The meeting after that could be devoted to aquatic screening and endpoints.

Randy

LAPSAR Meeting Notes 3-18-02.doc	**Name:** LAPSAR Meeting Notes 3-18-02.doc **Type:** Microsoft Word Document (application/msword) **Encoding:** base64

LAPSAR 3/18/02 Meeting Notes:

- ✓ Discussed the concept of an "addendum" to the LA/Pueblo Work Plan for biota sampling – **action was for Kirby to talk to John Young**

- ✓ Discussed how to involve interested parties – possible path forward was to present approach as it is being developed to NNMCAB, SanI, LACo, etc.

- ✓ Discussed how the canyon focus area was planning on using background data

- ✓ Discussed data sets
    1) **Background** [used to calculate sediment BVs]; collected pre-fire [1994,1996] in LA/Pueblo/Guaje/Indio/Ancho Canyons – upstream of all sources, located in non-LANL impacted canyons, or in pre-LANL sediment deposits; inorganics and radionuclides only
    2) **Investigation**; represents both pre-fire and post-fire conditions [1996-2001+] in LA/Pueblo/DP/Acid Canyons [note that DP/Acid were not fire affected] – downsteam of all suspected LANL sources in watershed
        a) **Removed samples**; subreaches ACS and LA-2E had sediment deposits removed as part of the ACS IA or non-ER post-fire mitigation efforts
        b) **Other samples**; materials that still remains in the canyons although it may have been buried by post-fire deposits or in some cases transported from the original sample location
    3) **Baseline sediment**; pre-fire or not fire affected sediments [1998-2001]; subreaches DP-1W, AC-1, LA-0, P-1FW; collected to address non-LANL "contaminant" sources
    4) **Baseline muck**; post-fire material collected upstream of all LANL liquid releases [2000-2002]

- ✓ Discussed dioxin data – questions about LANL sources [TA-73 incinerator may show decreasing concentration down slope] and available data – **action was to bring plots of available dioxin data to next meeting**

- ✓ Next meeting is 3/28/02 at 130pm

    Agenda items:
    - ✓ resolve addendum to work plan issue;
    - ✓ HPT or not resolved
    - ✓ Provide more information on HQ analysis – mean value by reach [or subreach], consider home range
    - ✓ Additional plots of COPECs – perhaps HQ/HI by subreach

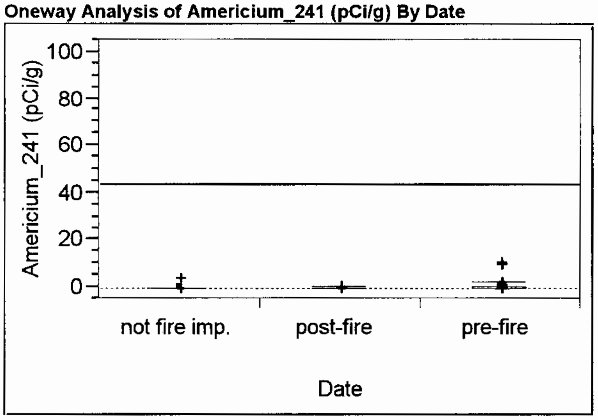
COPEC Notes – 3-28-02 LAPSAR Meeting

Group	Analyte name	Sources	Ubiquitous >BV, ESLs	Retain as COPEC?*
inorg	Antimony	LANL?, check maximum value, BKG	Not ubiquitous>BV, most values including BKG > plant ESL	
	Arsenic	BKG, CGF – major LANL – minor [AC]	Not common > BV, except post-fire; common > shrew, mouse ESL	
	Barium	CGF, BKG	Not common > BV, except post-fire	
	Cadmium	LANL	Commonly >BV, not commonly > ESL [plant, invert only]	
	Chromium__Total	LANL – TA-2 and DP?	>BV in ULAC/DP; > invert, plant ESL	Yes
	Cobalt	BKG, CGF, LANL [AC only], TS	Not common >BV except post-fire, most ESLs<<BV	
	Copper	BKG, CGF, LANL, TS	Commonly >BV and plant, invert ESLs	Yes
	Cyanide__Total	CGF, BKG	Only >BV in post-fire samples	
	Lead	BKG, CGF, LANL, TS	Commonly >BV and robin, shrew ESLs	Yes
	Manganese	CGF, BKG	Primarily >BV in post-fire samples	
	Mercury	LANL	Commonly >BV and invert ESL	Yes
	Methylmercury__1__Ion	LANL [limited data]	>robin ESL	Yes
	Selenium	CGF, LANL, BKG, TS	Common >BV and plant ESL	
	Silver	LANL	Common >BV, mammal ESLs<<BV	Yes
	Thallium	BKG [black sands], TS	Not common>BV, plant ESL<<BV	Yes
	Titanium	BKG [black sands]	One sample in P-4E>BV	
	Uranium	LANL, BKG	One sample in P-1E>ESL	
	Zinc	BKG, CGF, LANL, TS	Commonly>BV, BV>>plant ESL	Yes
Pah	Acenaphthene	TS	DLs>ESLs, not frequently detected, or commonly>ESL, no bird ESLs	
	Chrysene	TS	DLs>ESLs, 2 samples >ESLs, no bird ESLs	
	Naphthalene	TS, CGF	DLs>ESLs, not frequently detected, or commonly>ESL, no bird ESLs	
pcb	Aroclor_1254	LANL, minor TS	Exceed many ESLs, widely distributed but not commonly detected	Yes
	Aroclor_1260	LANL, minor TS	Not commonly > ESLs [robin only in selected areas]	Yes
pest	DDE_4_4___	TS – used widely as pesticide	Ubiquitous for birds and commonly detected in upper watershed	
	DDT_4_4___	TS – used widely as pesticide	Ubiquitous for birds and commonly detected in upper watershed	
	Endrin_Aldehyde	LANL? – LA-1C only	Lowest ESL is plants, also > robin ESL	
rad	Americium_241_GS	LANL, very minor CGF,BKG	Commonly > BV, only > invert ESL in 2 samples	
	Plutonium_239	LANL, very minor CGF,BKG	Commonly > BV, only > invert ESL in AC and PC samples [<10% and <10x]	
svoc	Bis_2_ethylhexyl_phthalate	TS	Not greatly or commonly > robin ESL,	

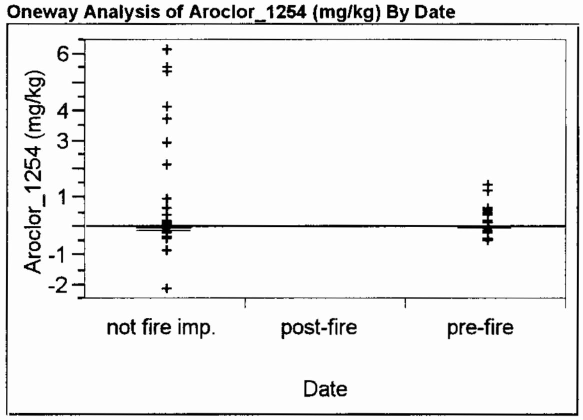
LANL – Laboratory source; BKG –background; CGF – Cerro Grande fire; TS – Town site

* proposed list from LANL

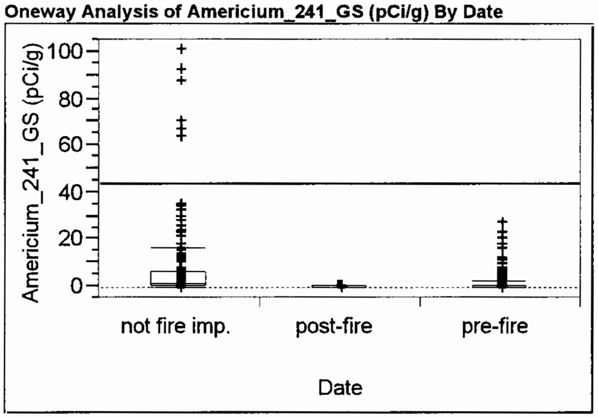
Oneway Analysis of Americium_241 (pCi/g) By Date



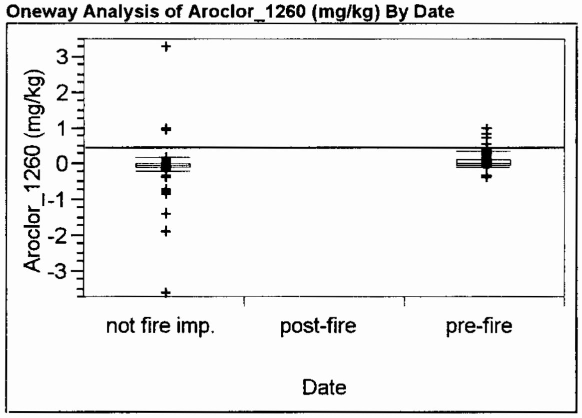
Oneway Analysis of Aroclor_1254 (mg/kg) By Date



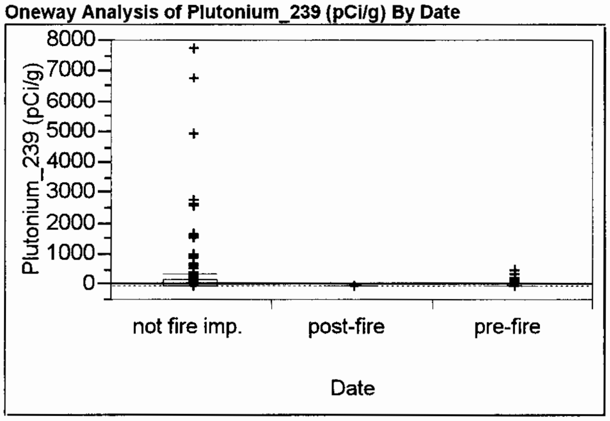
Oneway Analysis of Americium_241_GS (pCi/g) By Date



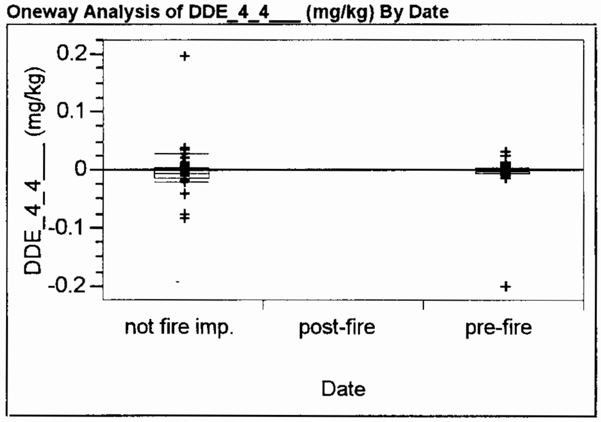
Oneway Analysis of Aroclor_1260 (mg/kg) By Date



Oneway Analysis of Plutonium_239 (pCi/g) By Date



Oneway Analysis of DDE_4_4___ (mg/kg) By Date



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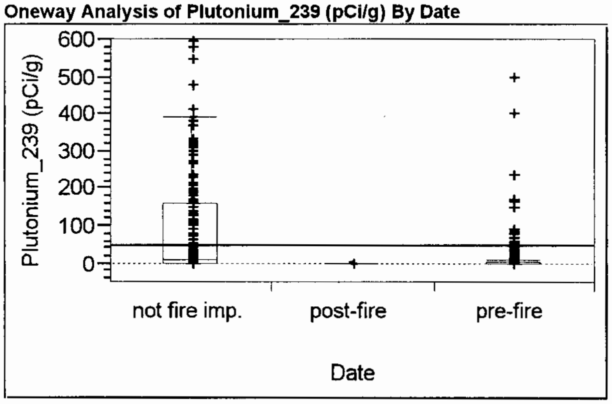
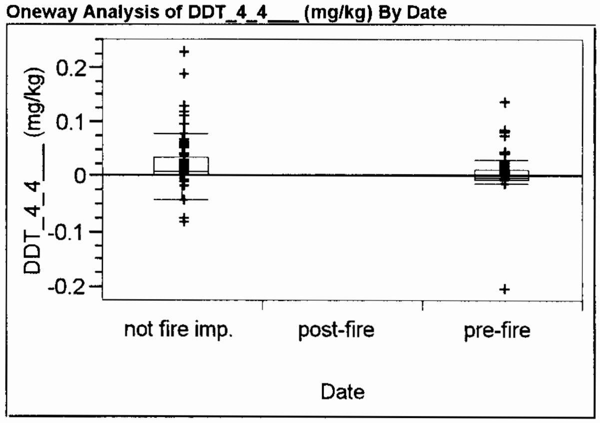
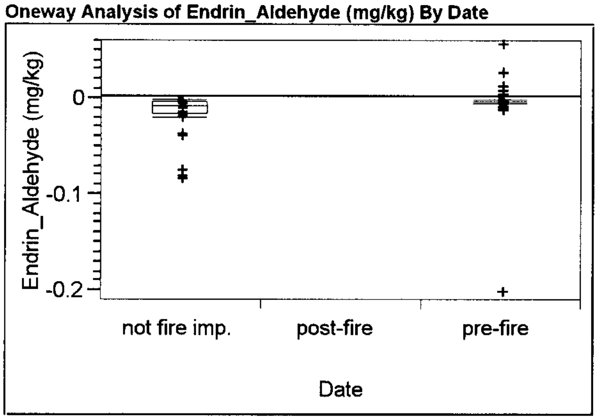


Oneway Analysis of DDT_4_4___ (mg/kg) By Date

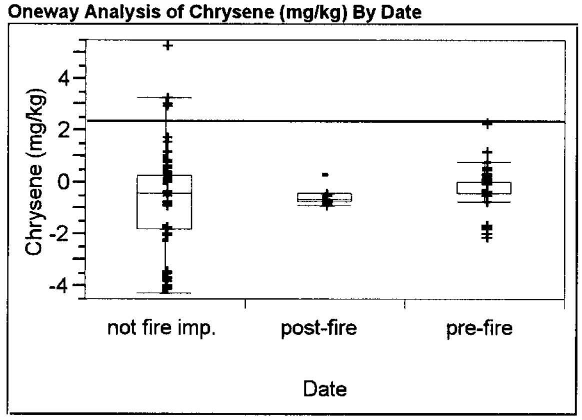


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

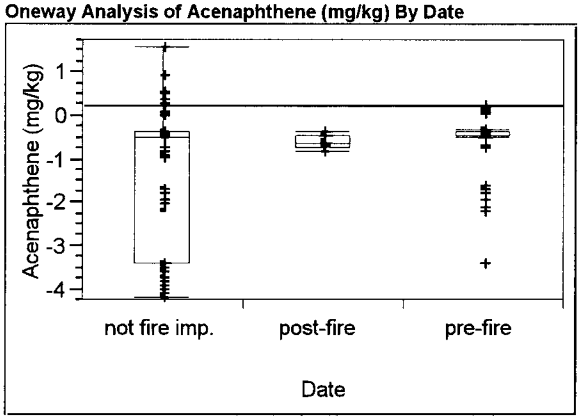
Oneway Analysis of Endrin_Aldehyde (mg/kg) By Date



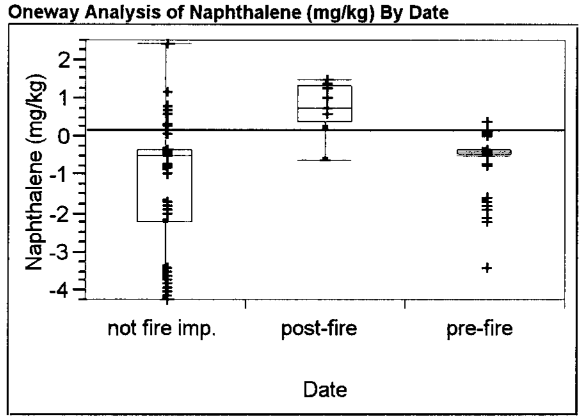
Oneway Analysis of Chrysene (mg/kg) By Date



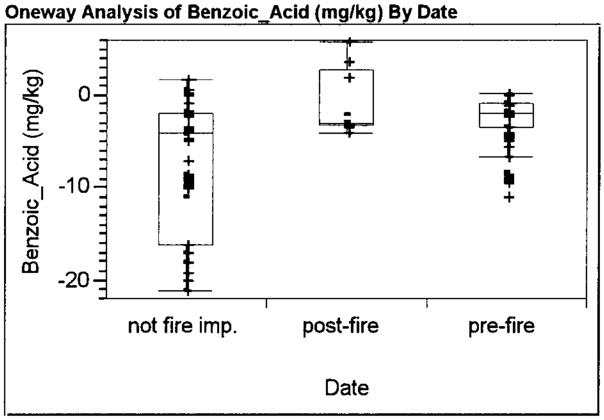
Oneway Analysis of Acenaphthene (mg/kg) By Date



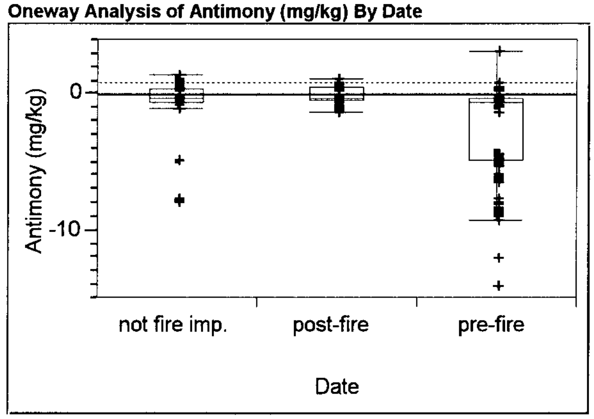
Oneway Analysis of Naphthalene (mg/kg) By Date



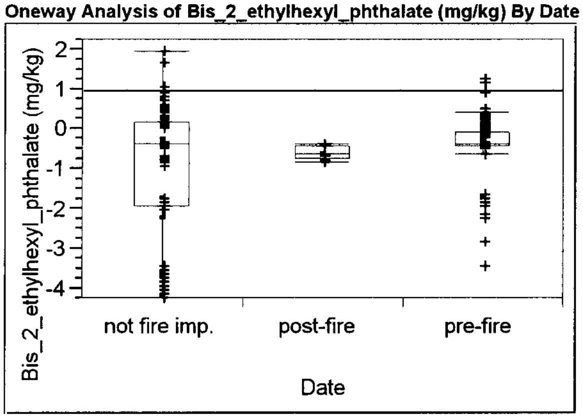
Oneway Analysis of Benzoic_Acid (mg/kg) By Date



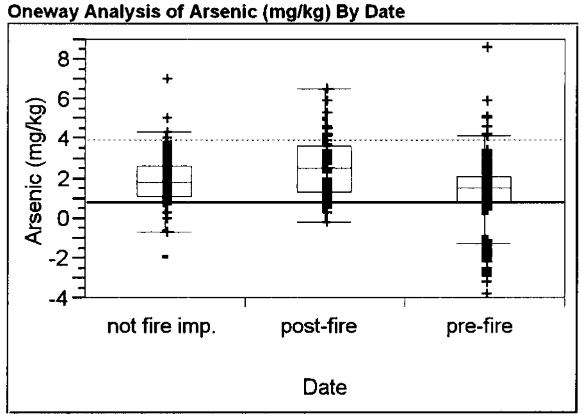
Oneway Analysis of Antimony (mg/kg) By Date



Oneway Analysis of Bis_2_ethylhexyl_phthalate (mg/kg) By Date

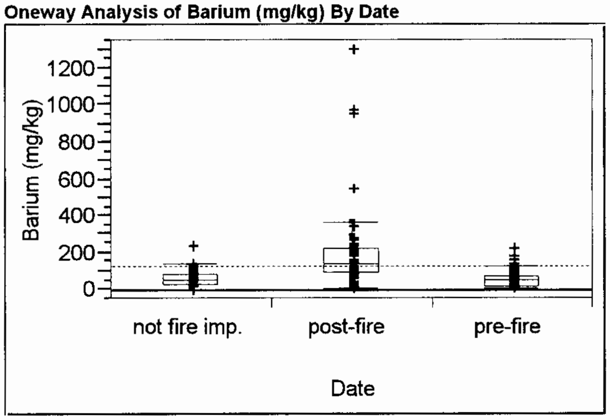


Oneway Analysis of Arsenic (mg/kg) By Date

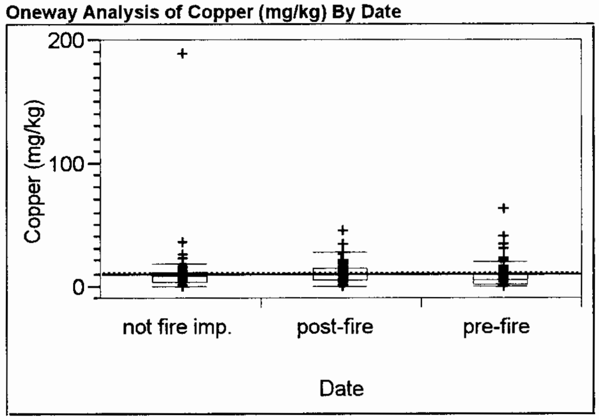


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

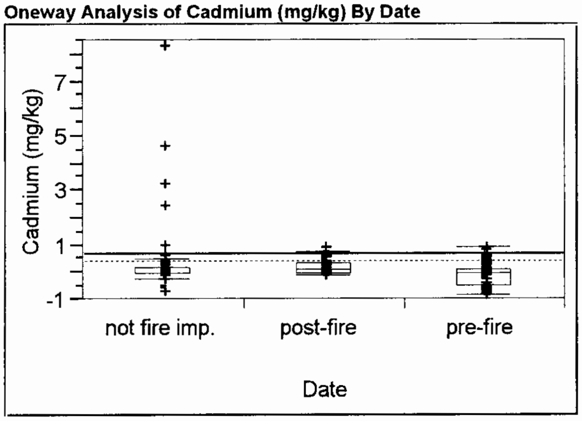
Oneway Analysis of Barium (mg/kg) By Date



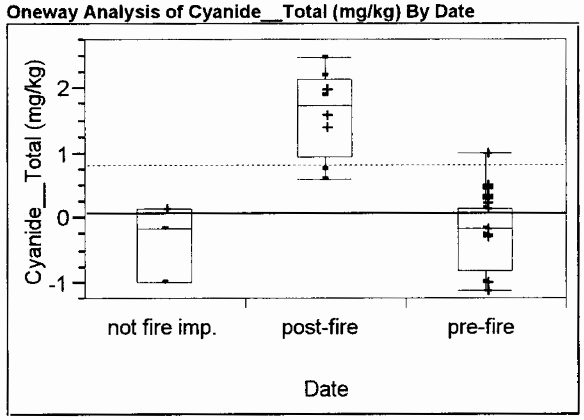
Oneway Analysis of Copper (mg/kg) By Date



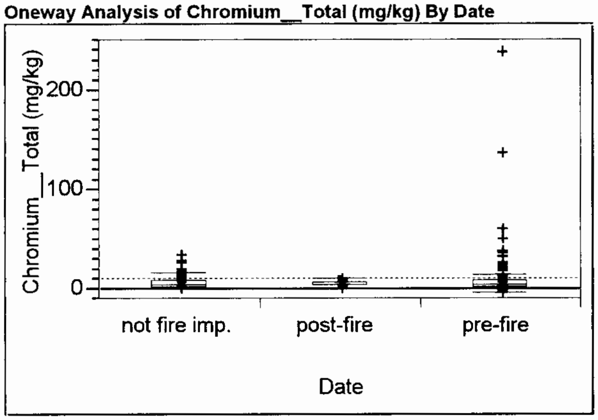
Oneway Analysis of Cadmium (mg/kg) By Date



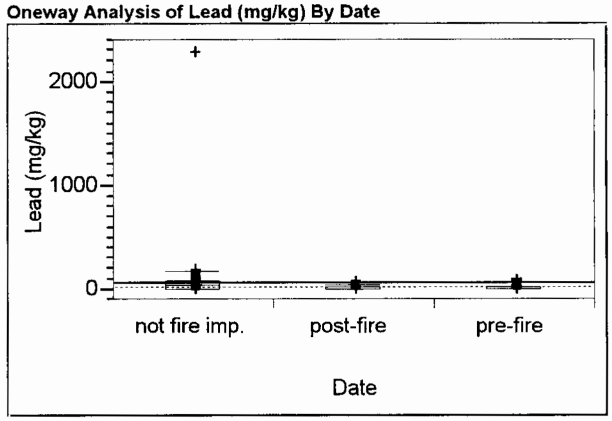
Oneway Analysis of Cyanide__Total (mg/kg) By Date



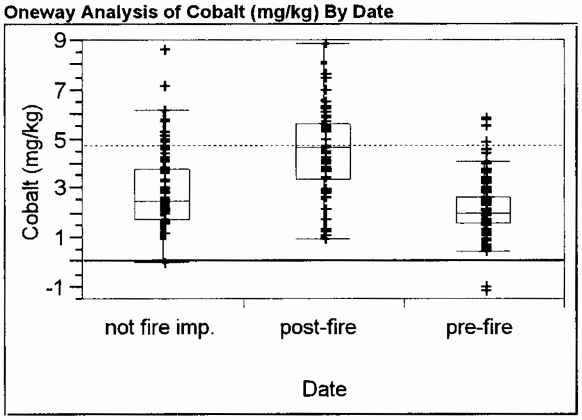
Oneway Analysis of Chromium__Total (mg/kg) By Date



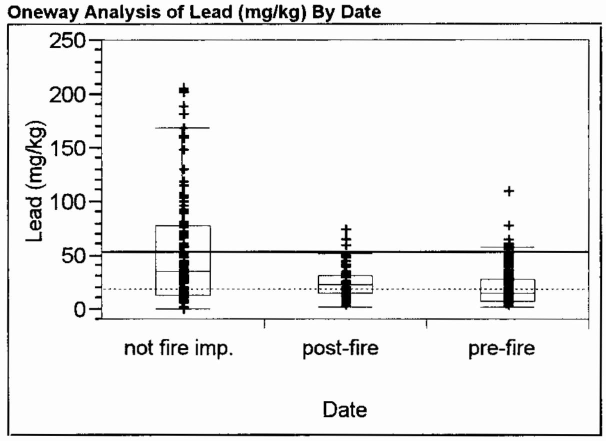
Oneway Analysis of Lead (mg/kg) By Date



Oneway Analysis of Cobalt (mg/kg) By Date

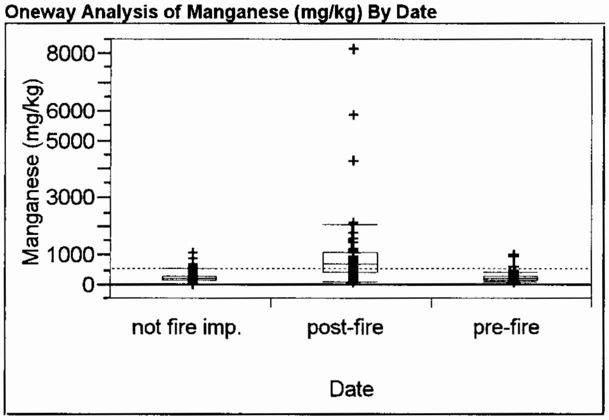


Oneway Analysis of Lead (mg/kg) By Date

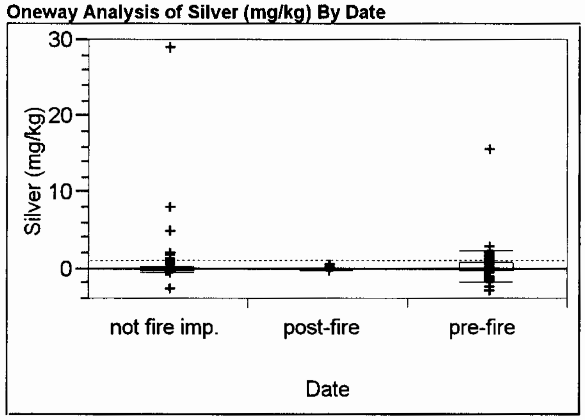


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

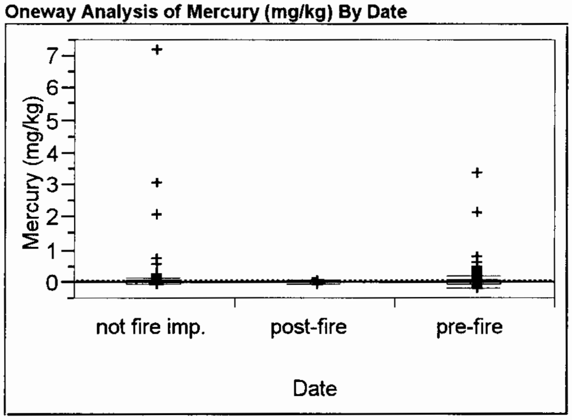
Oneway Analysis of Manganese (mg/kg) By Date



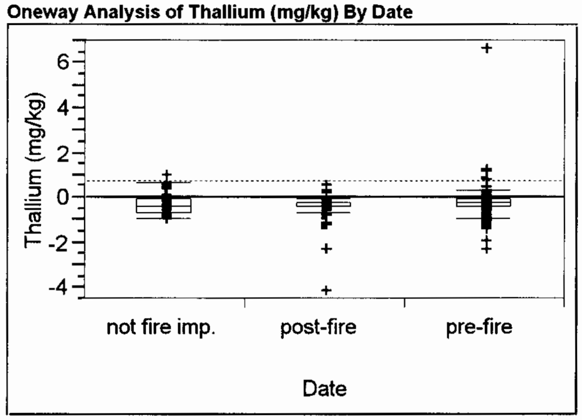
Oneway Analysis of Silver (mg/kg) By Date



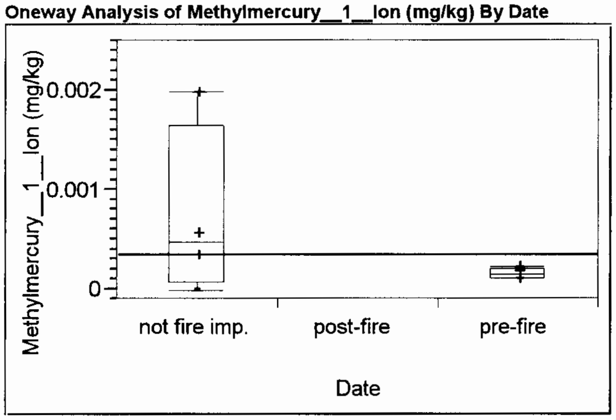
Oneway Analysis of Mercury (mg/kg) By Date



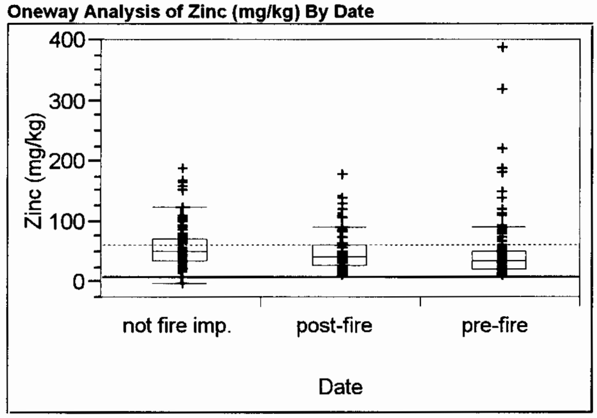
Oneway Analysis of Thallium (mg/kg) By Date



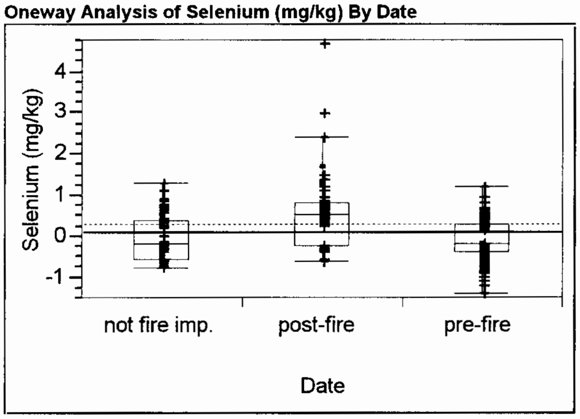
Oneway Analysis of Methylmercury__1__Ion (mg/kg) By Date



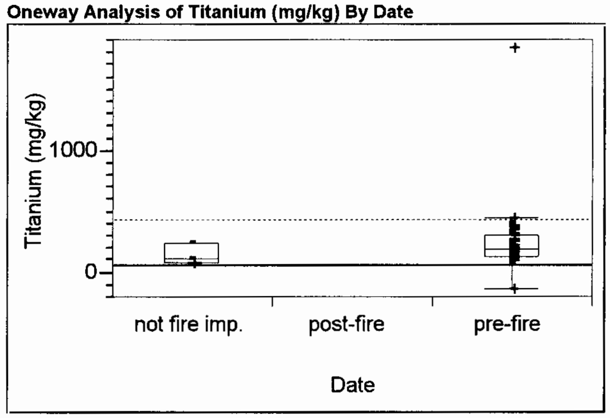
Oneway Analysis of Zinc (mg/kg) By Date



Oneway Analysis of Selenium (mg/kg) By Date

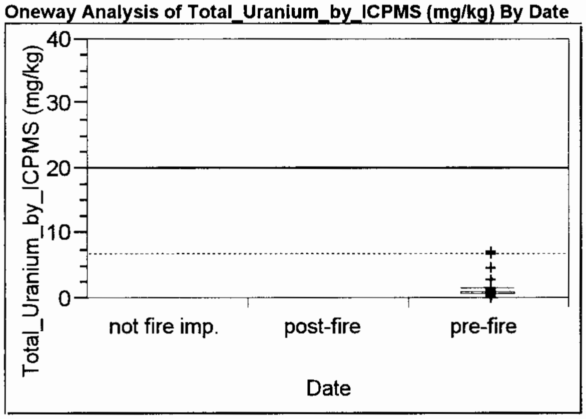


Oneway Analysis of Titanium (mg/kg) By Date

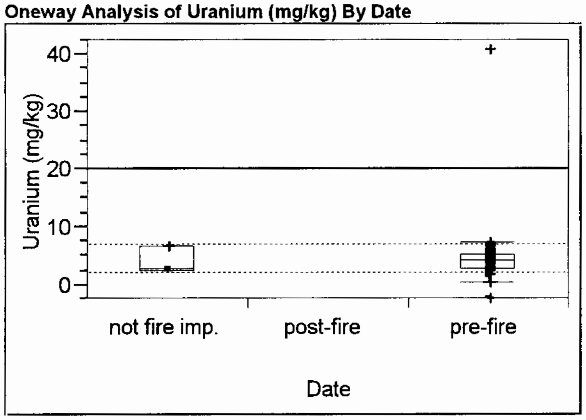


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

Oneway Analysis of Total_Uranium_by_ICPMS (mg/kg) By Date



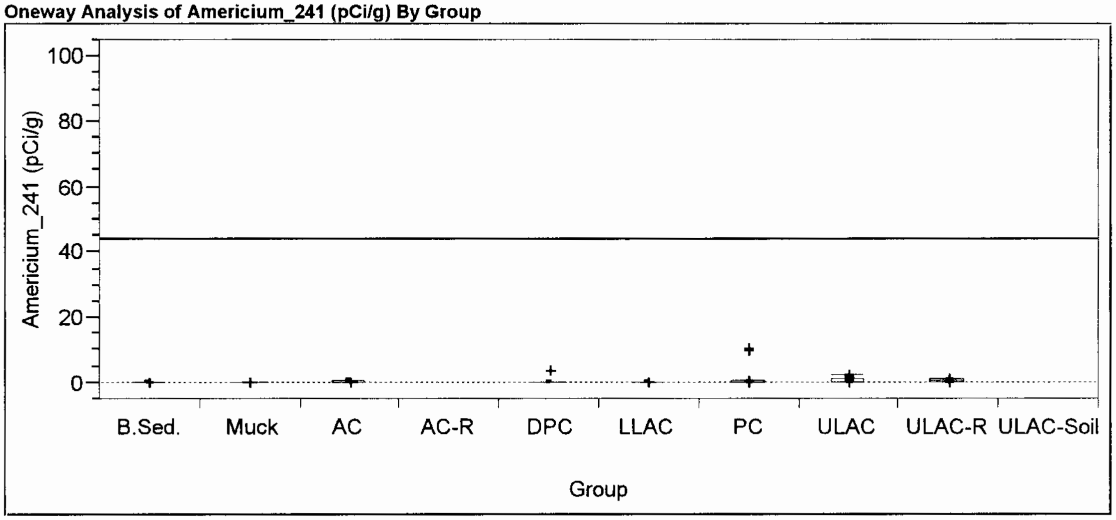
Oneway Analysis of Uranium (mg/kg) By Date



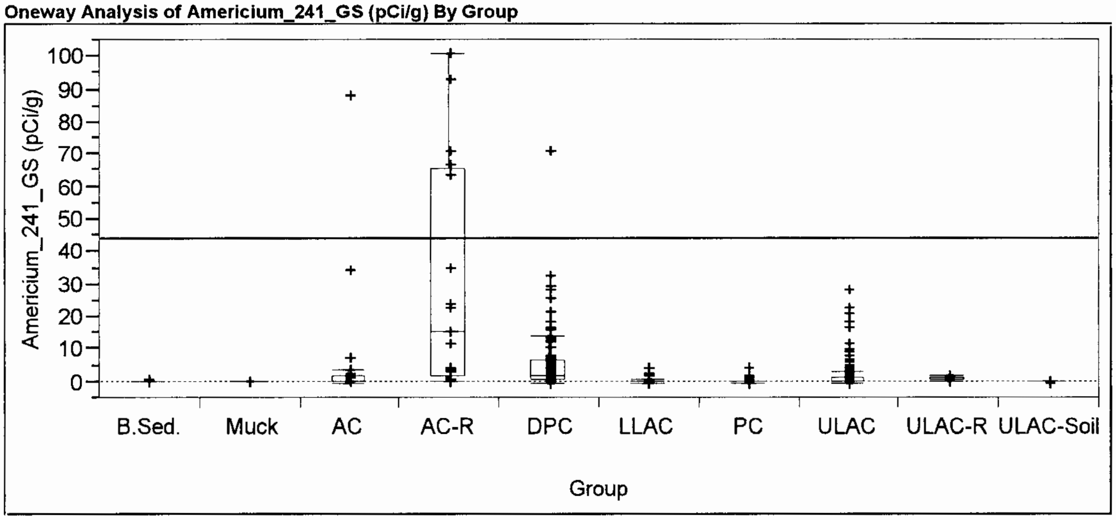
Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

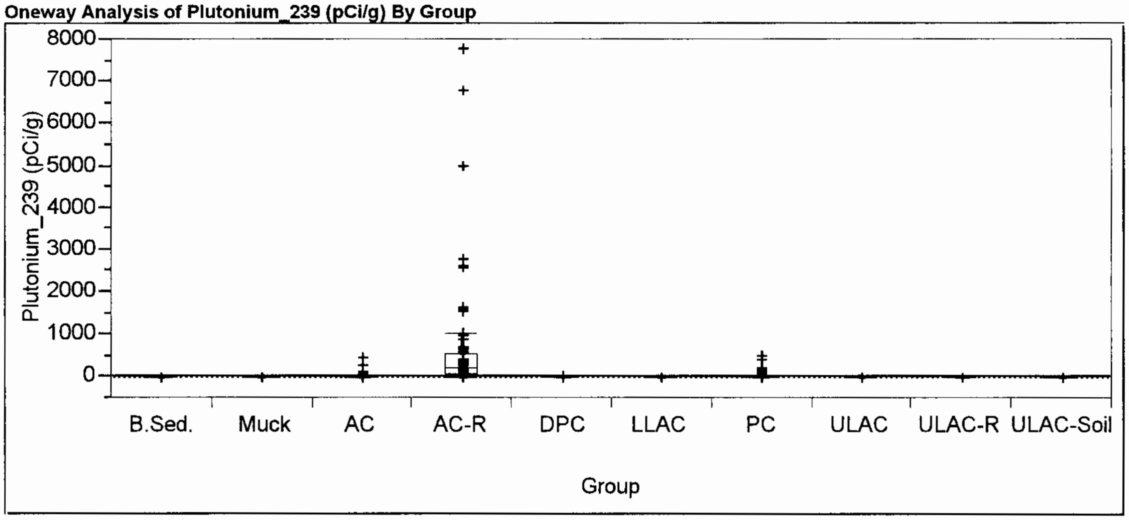
Oneway Analysis of Americium_241 (pCi/g) By Group



Oneway Analysis of Americium_241_GS (pCi/g) By Group

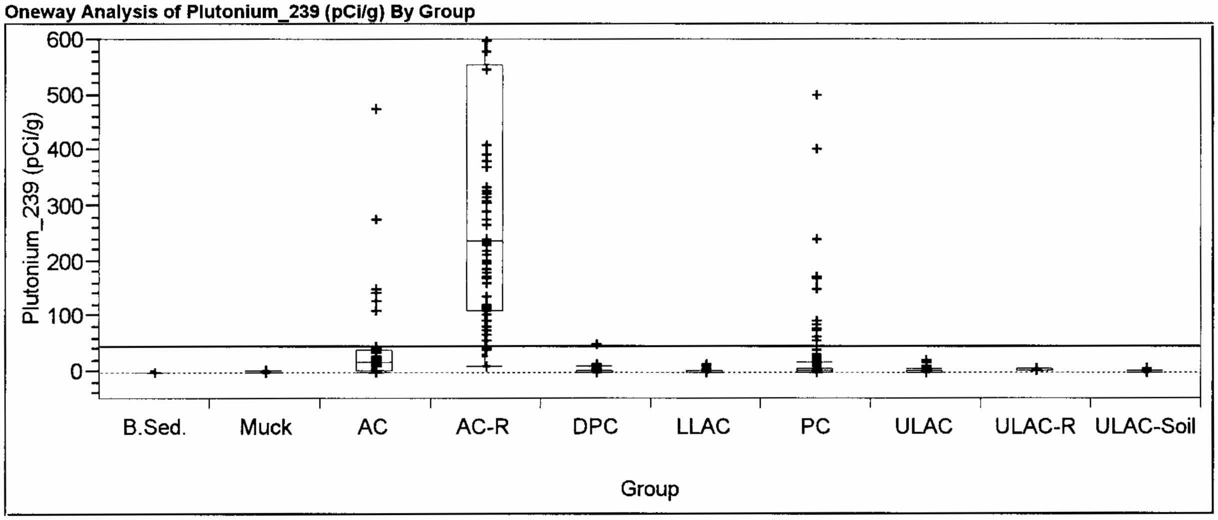


Oneway Analysis of Plutonium_239 (pCi/g) By Group

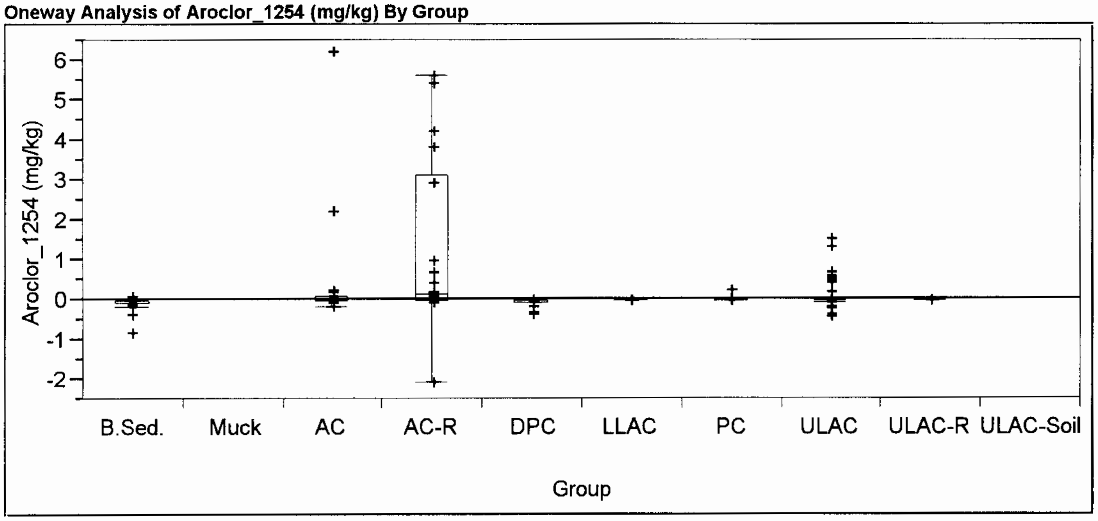


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

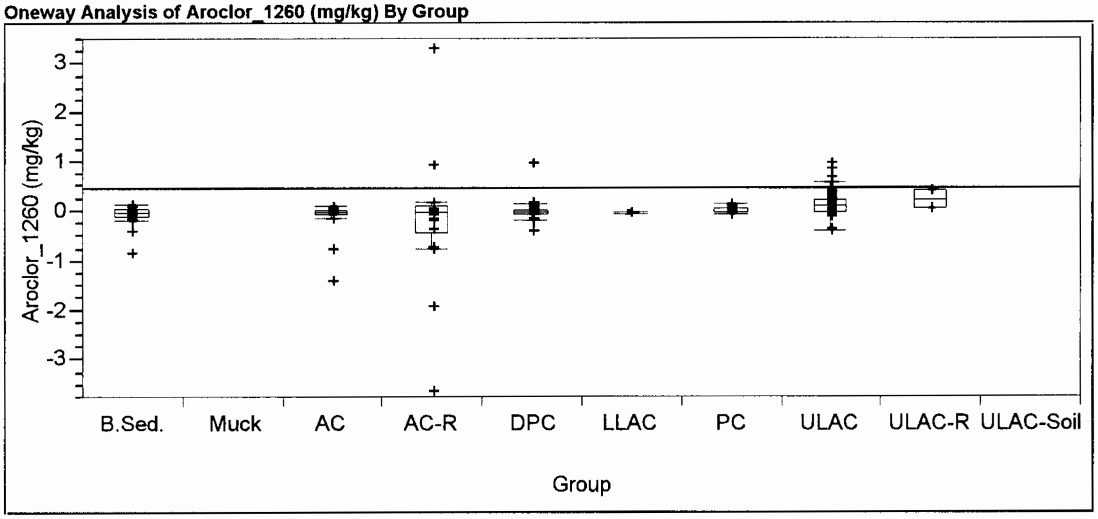
Oneway Analysis of Plutonium_239 (pCi/g) By Group



Oneway Analysis of Aroclor_1254 (mg/kg) By Group

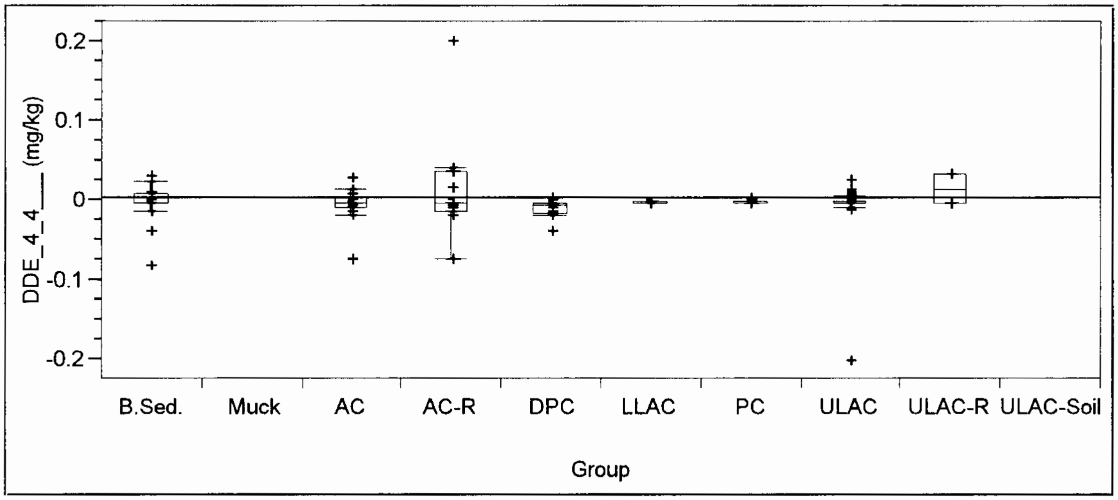


Oneway Analysis of Aroclor_1260 (mg/kg) By Group

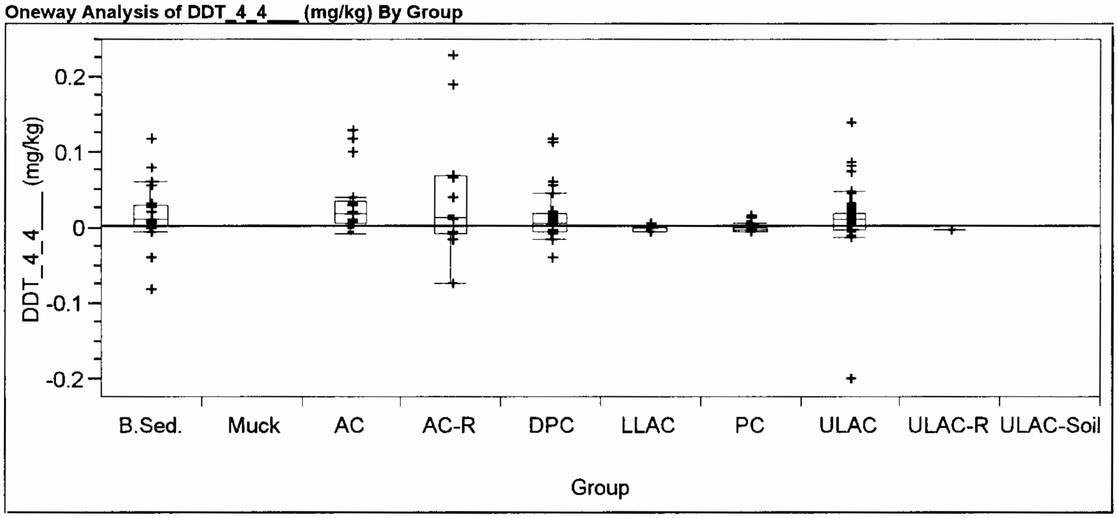


Oneway Analysis of DDE_4_4___ (mg/kg) By Group

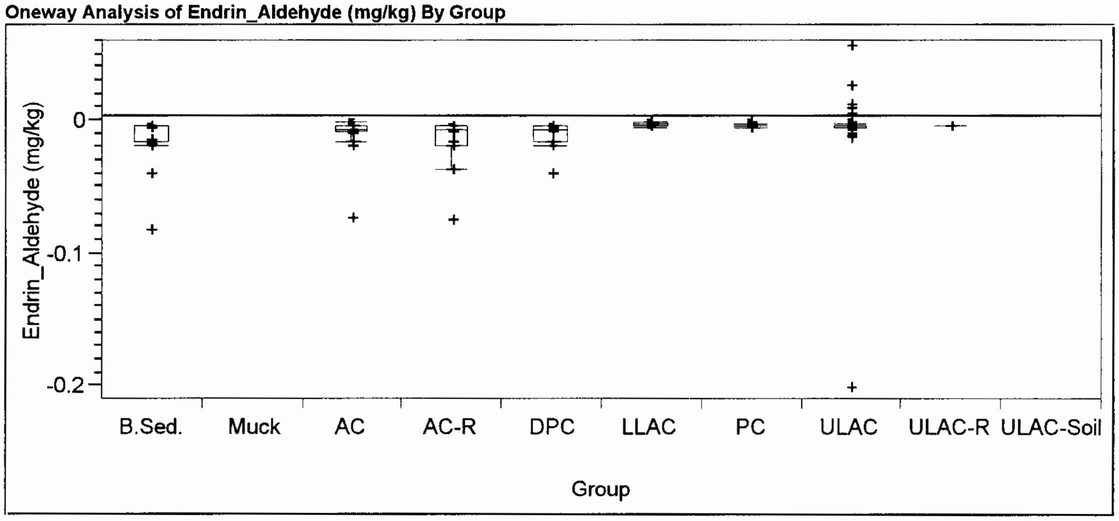
Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1



Oneway Analysis of DDT_4_4___ (mg/kg) By Group

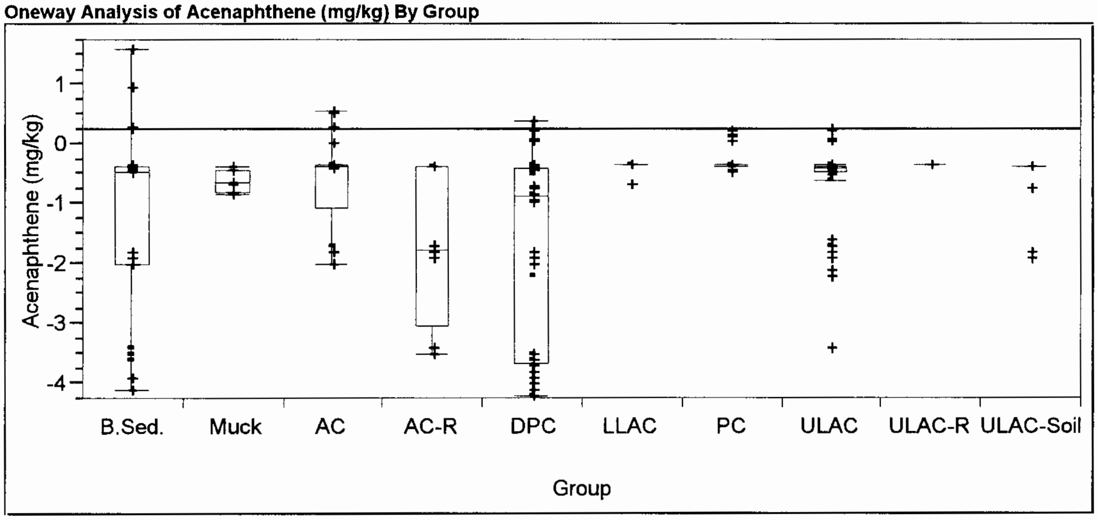


Oneway Analysis of Endrin_Aldehyde (mg/kg) By Group

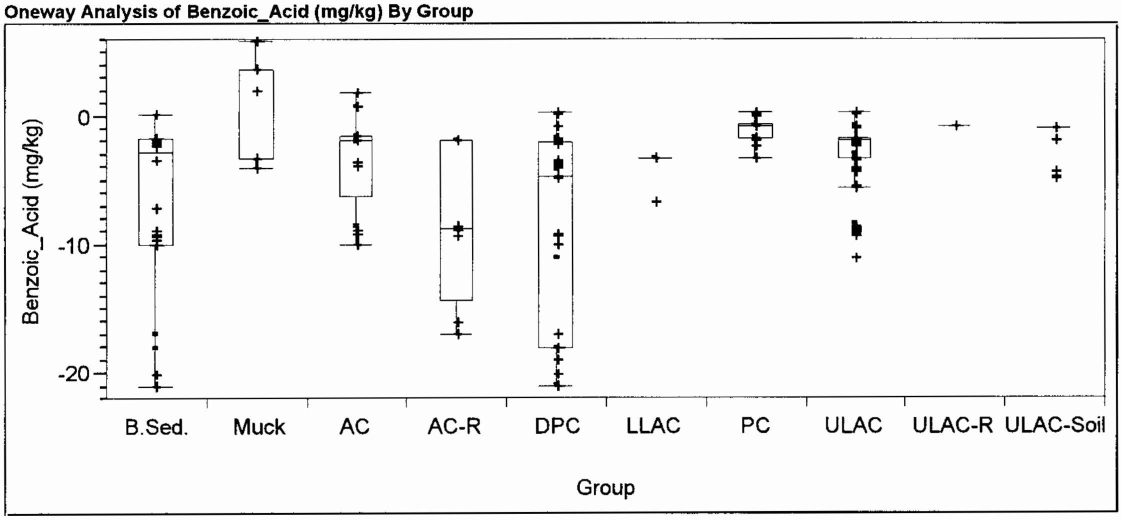


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

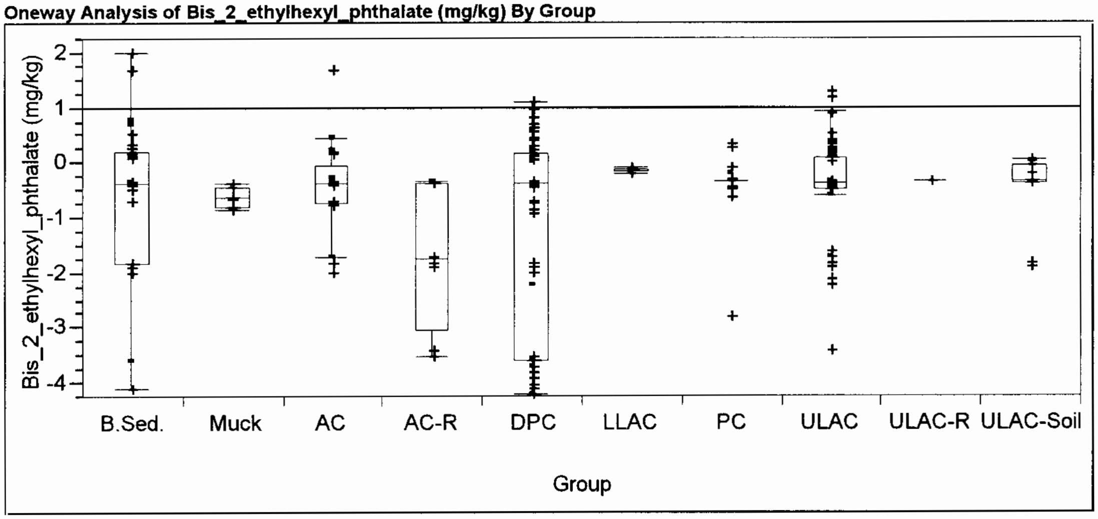
Oneway Analysis of Acenaphthene (mg/kg) By Group



Oneway Analysis of Benzoic_Acid (mg/kg) By Group

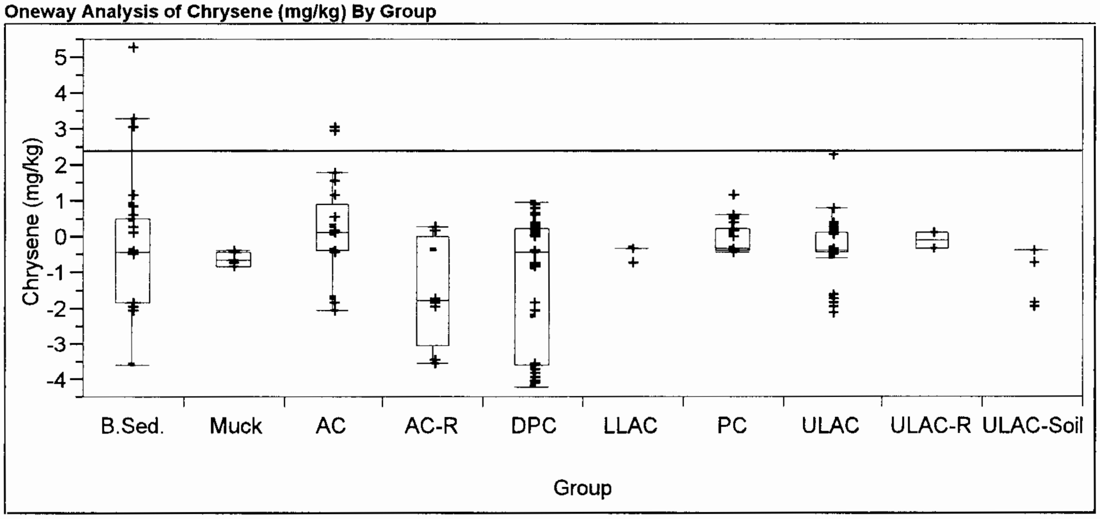


Oneway Analysis of Bis_2_ethylhexyl_phthalate (mg/kg) By Group

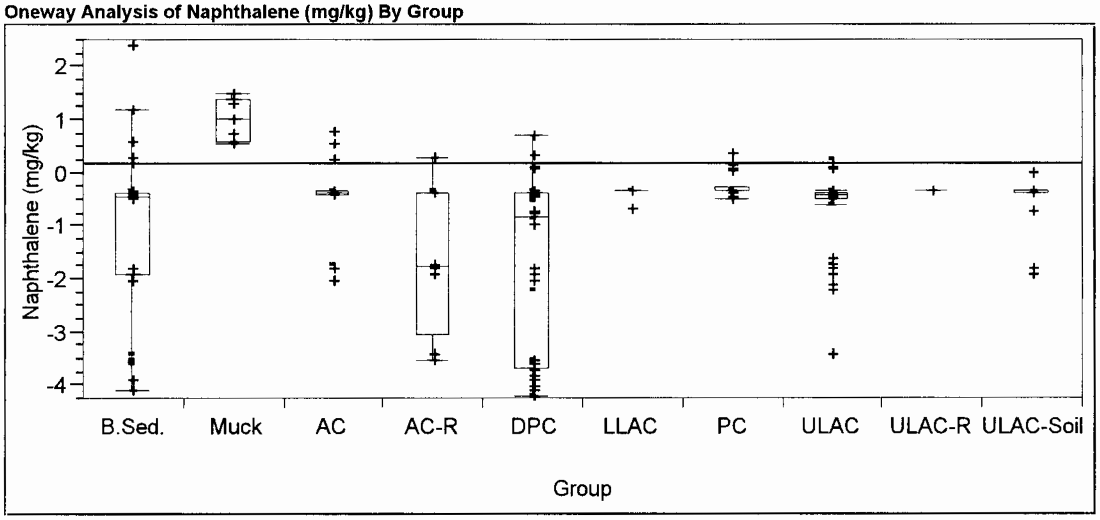


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

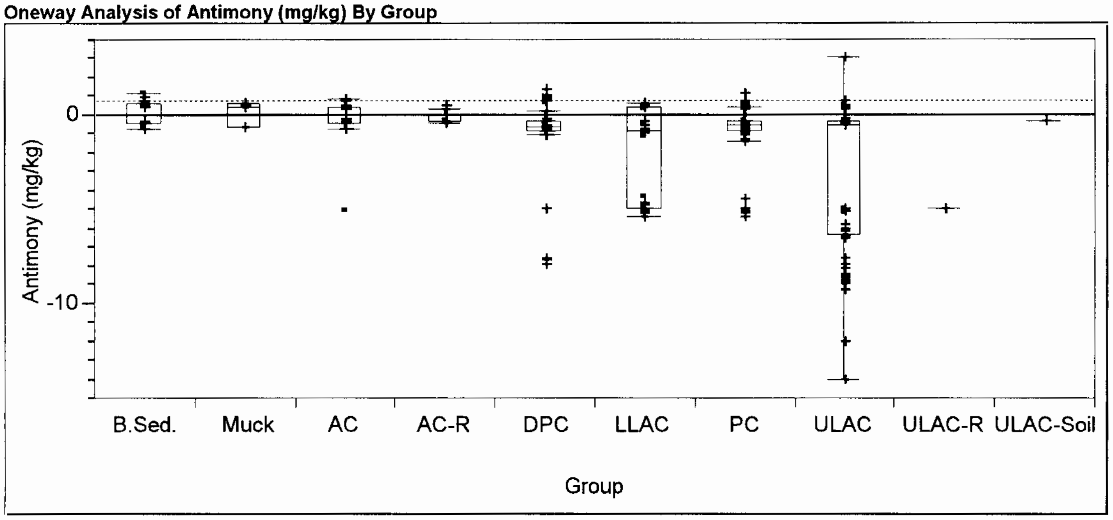
Oneway Analysis of Chrysene (mg/kg) By Group



Oneway Analysis of Naphthalene (mg/kg) By Group

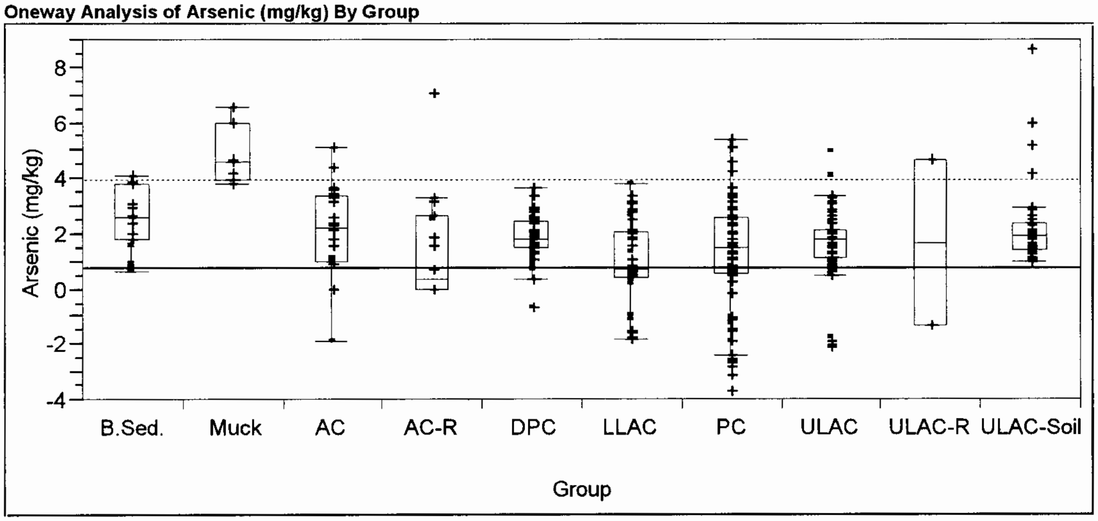


Oneway Analysis of Antimony (mg/kg) By Group

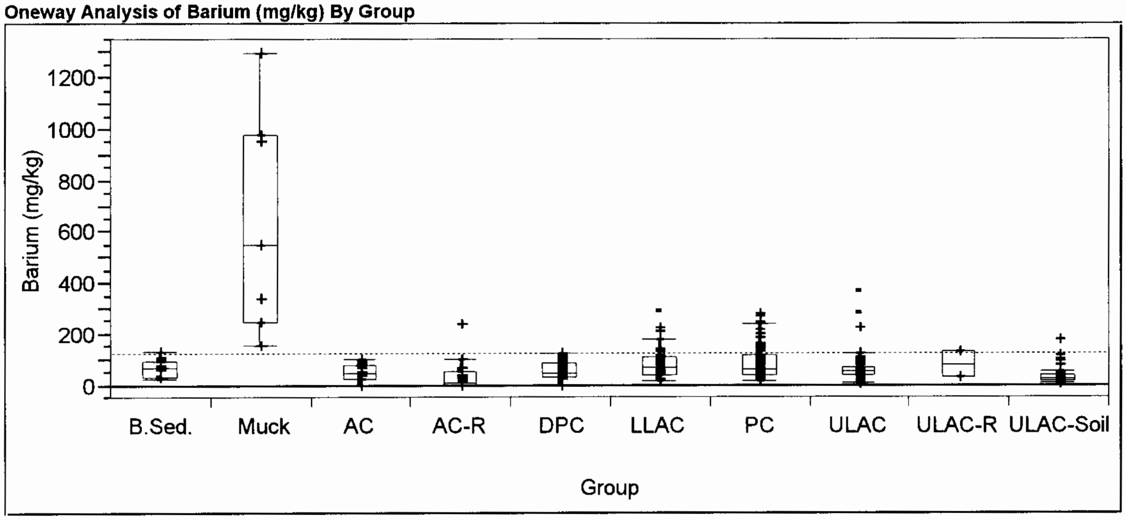


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

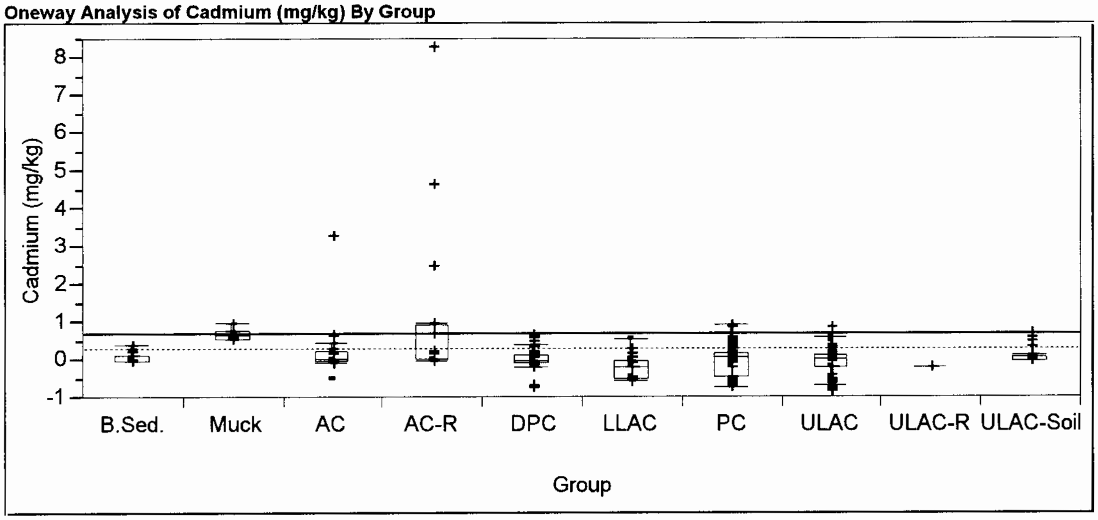
Oneway Analysis of Arsenic (mg/kg) By Group



Oneway Analysis of Barium (mg/kg) By Group

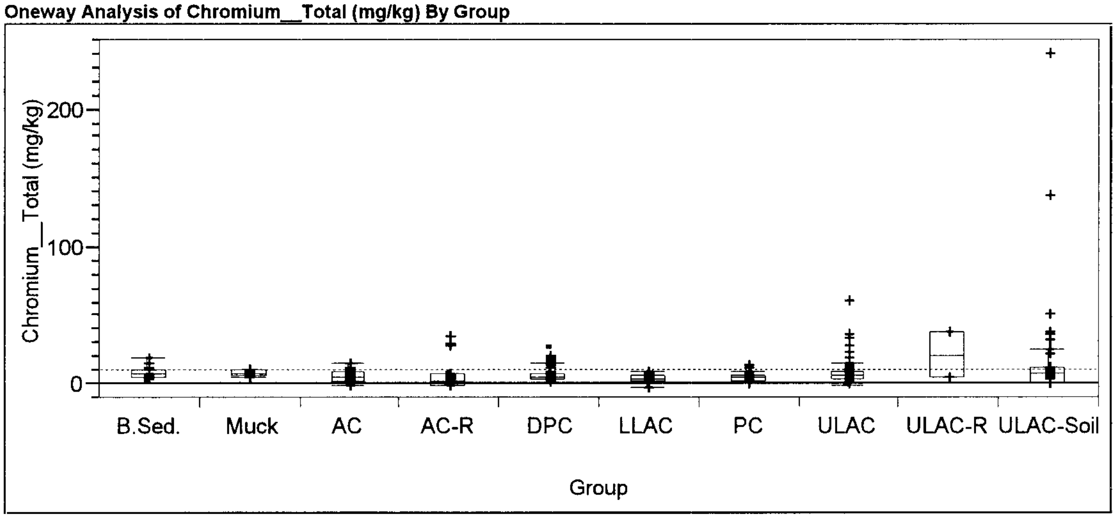


Oneway Analysis of Cadmium (mg/kg) By Group

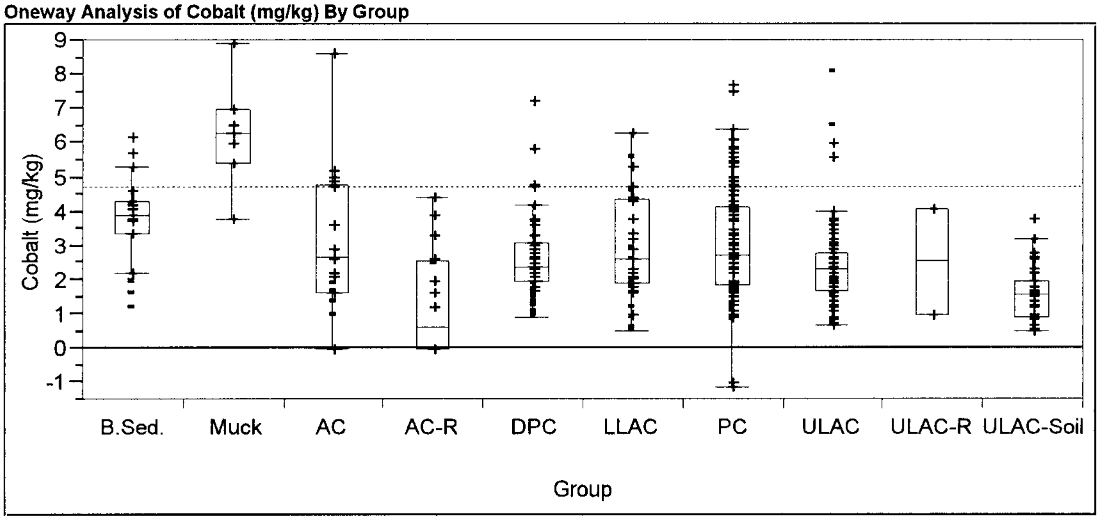


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

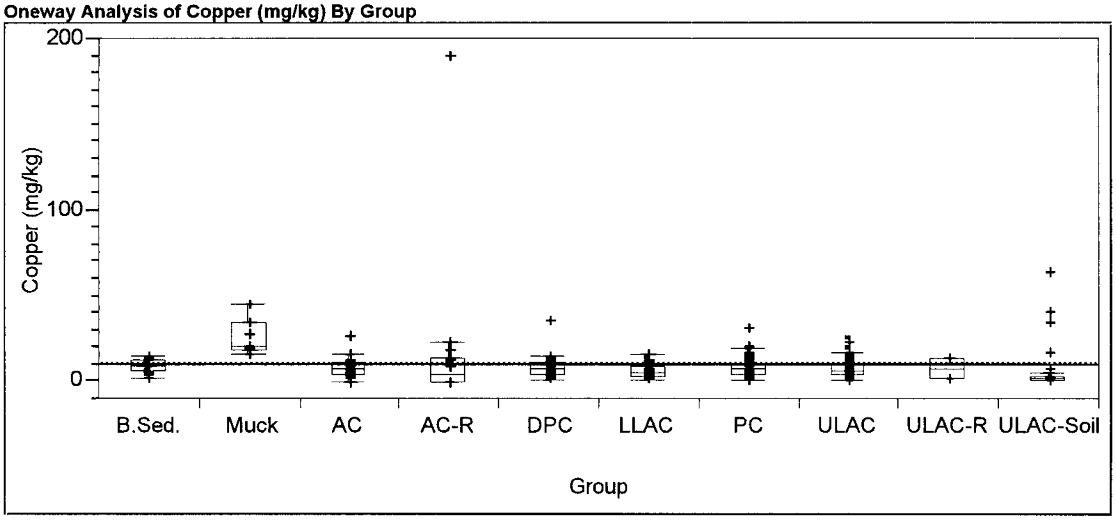
Oneway Analysis of Chromium__Total (mg/kg) By Group



Oneway Analysis of Cobalt (mg/kg) By Group

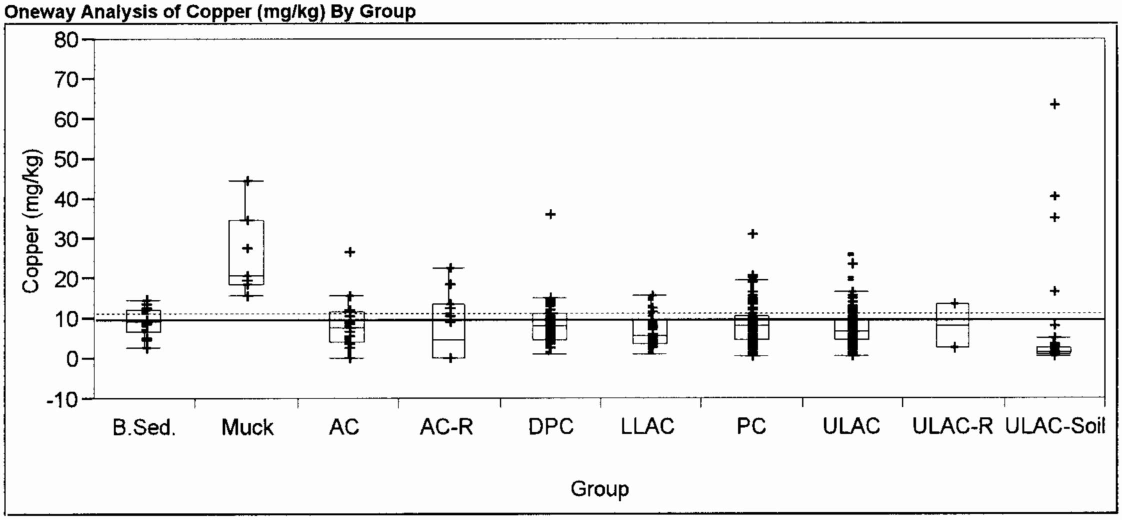


Oneway Analysis of Copper (mg/kg) By Group

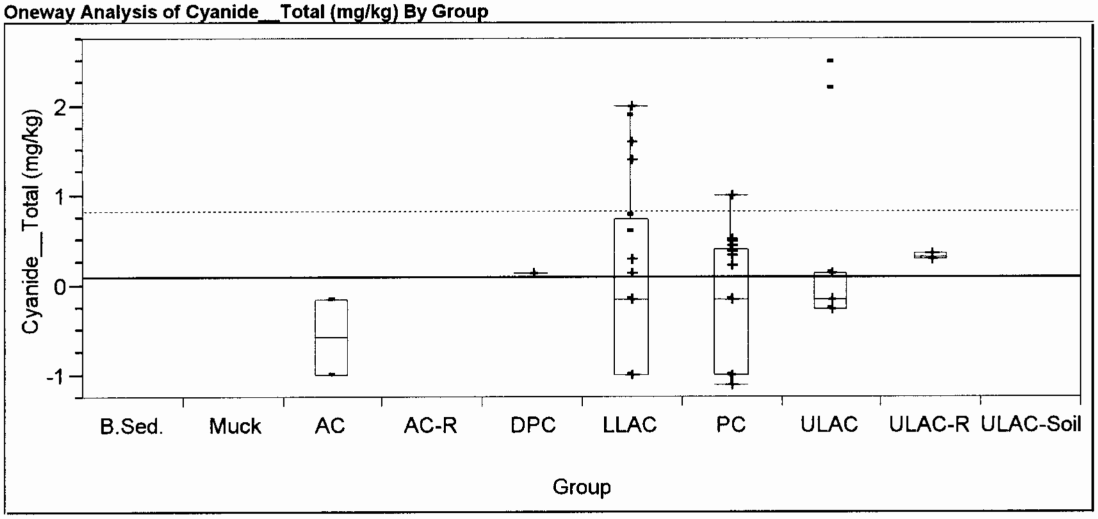


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

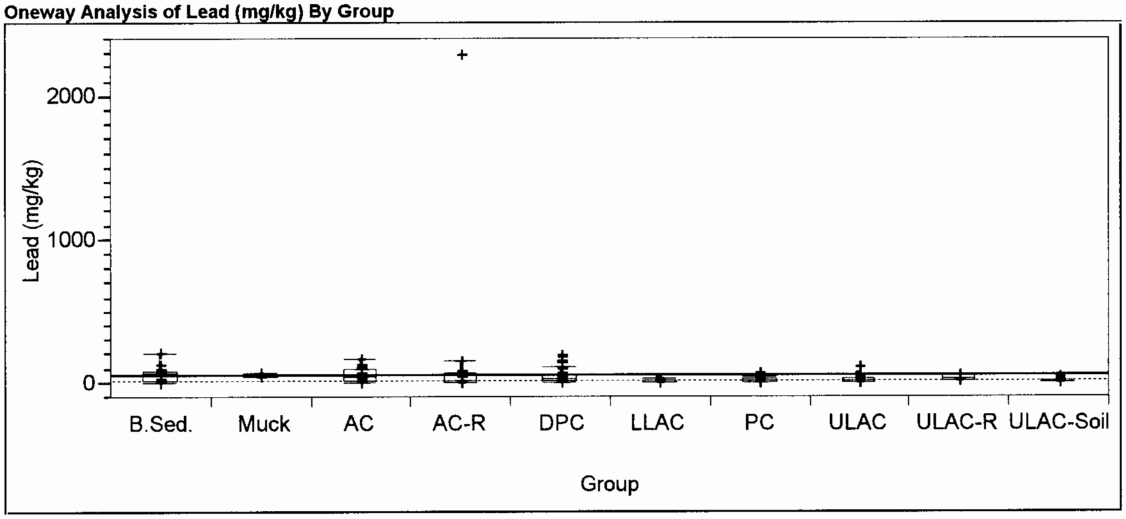
Oneway Analysis of Copper (mg/kg) By Group



Oneway Analysis of Cyanide__Total (mg/kg) By Group

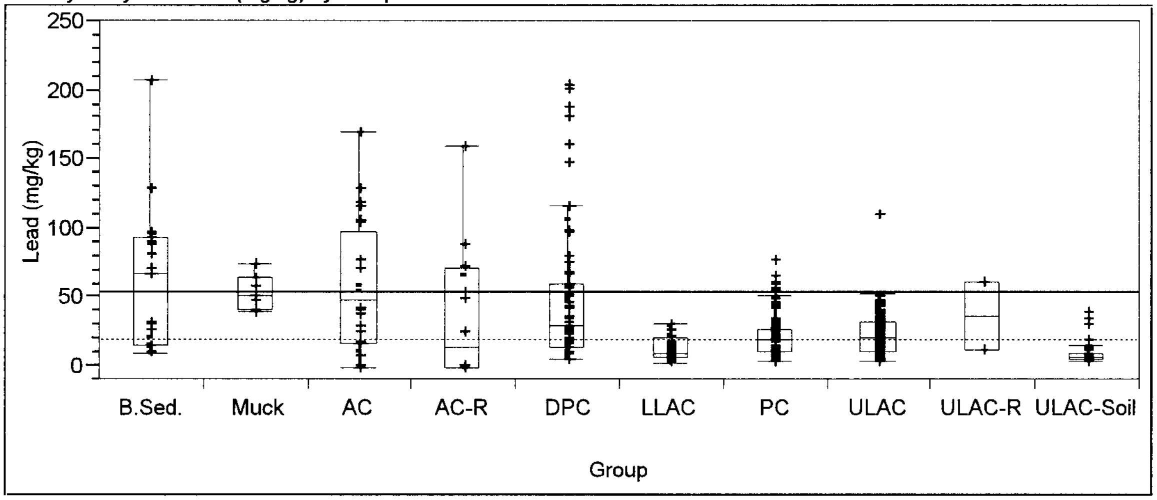


Oneway Analysis of Lead (mg/kg) By Group

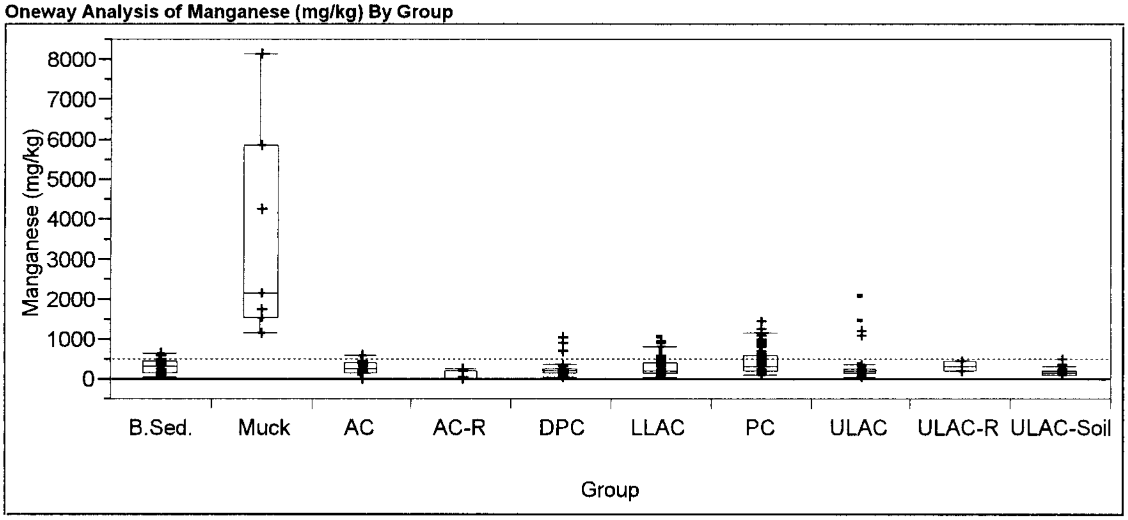


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

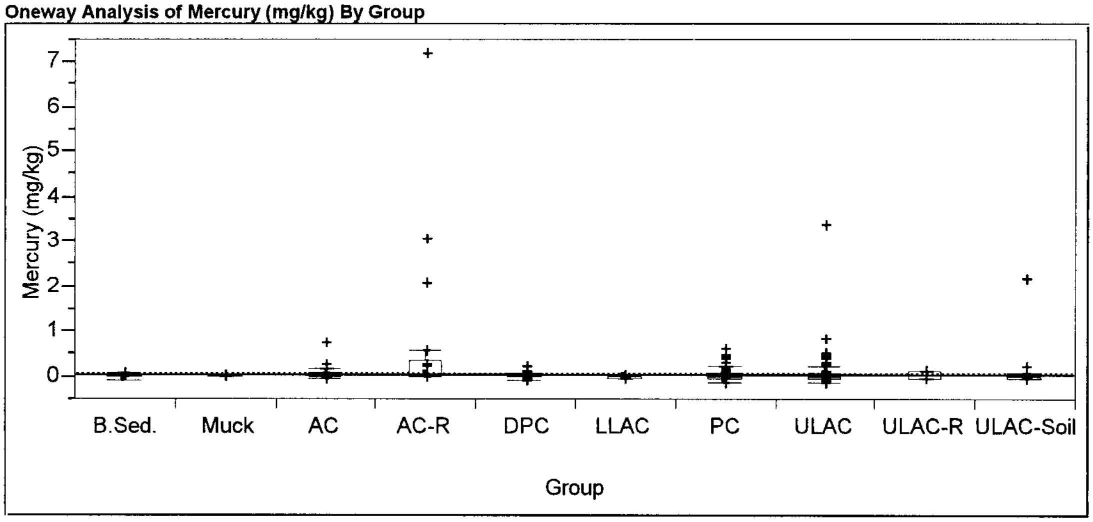
Oneway Analysis of Lead (mg/kg) By Group



Oneway Analysis of Manganese (mg/kg) By Group

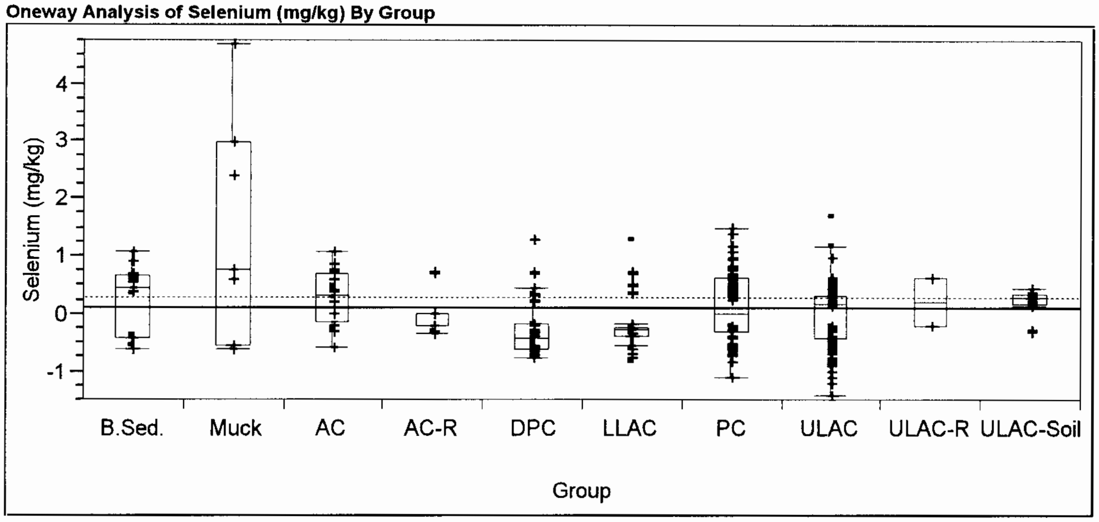


Oneway Analysis of Mercury (mg/kg) By Group

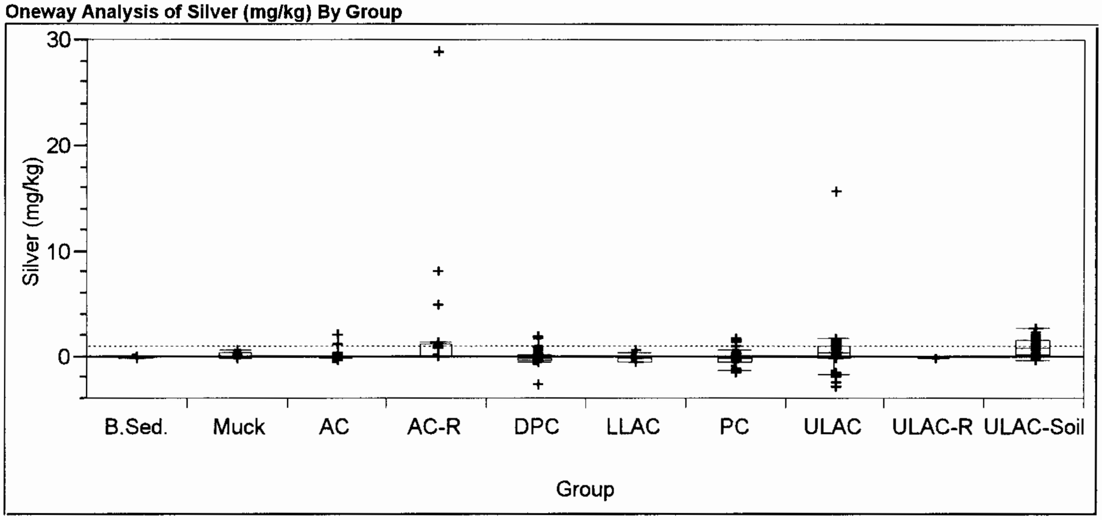


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

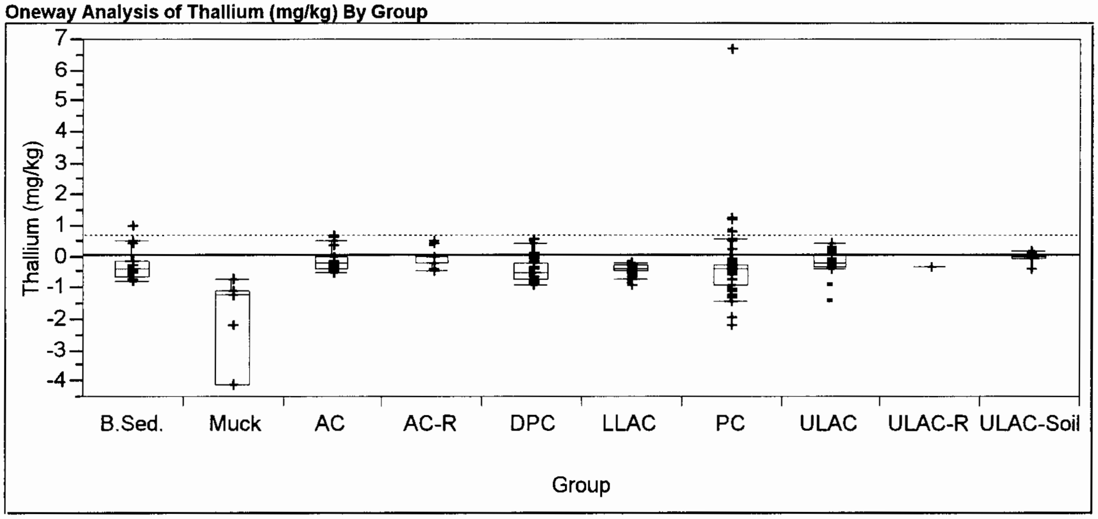
Oneway Analysis of Selenium (mg/kg) By Group



Oneway Analysis of Silver (mg/kg) By Group

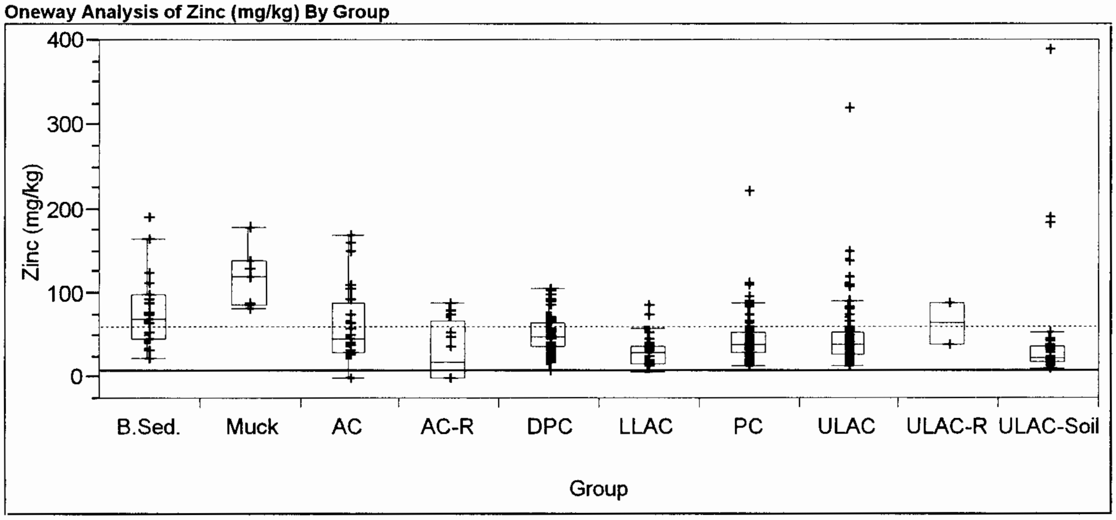


Oneway Analysis of Thallium (mg/kg) By Group

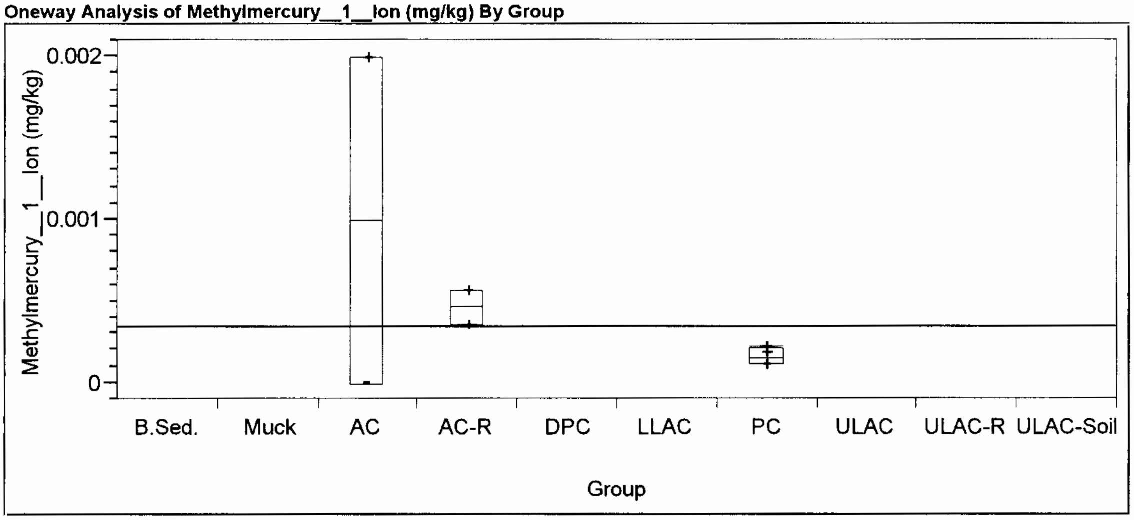


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

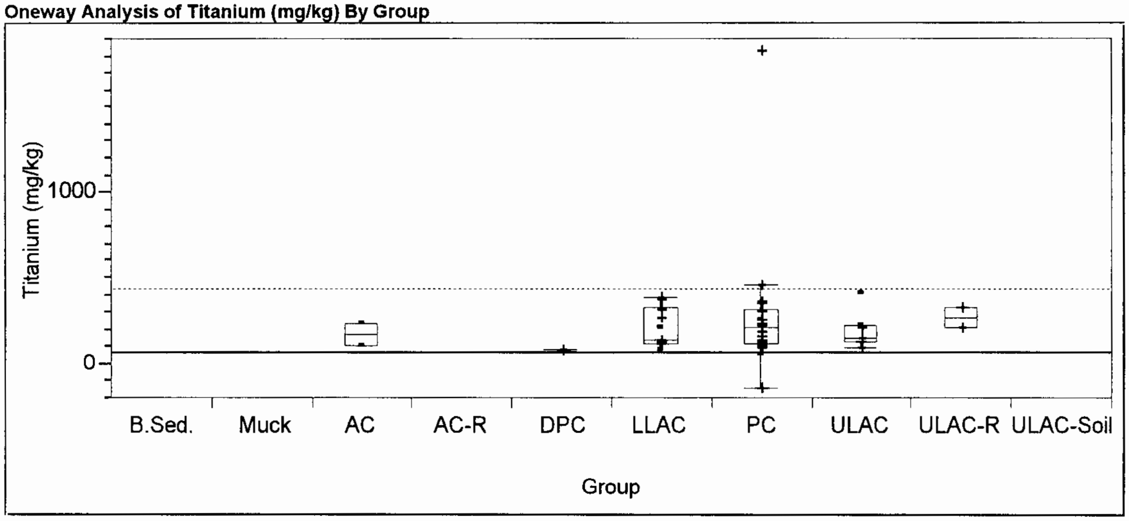
Oneway Analysis of Zinc (mg/kg) By Group



Oneway Analysis of Methylmercury__1__Ion (mg/kg) By Group

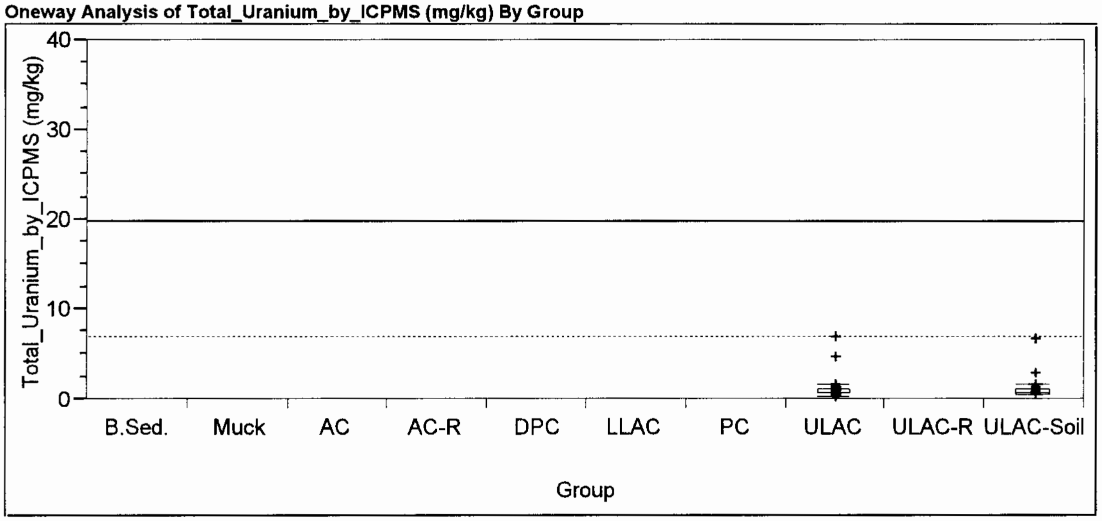


Oneway Analysis of Titanium (mg/kg) By Group

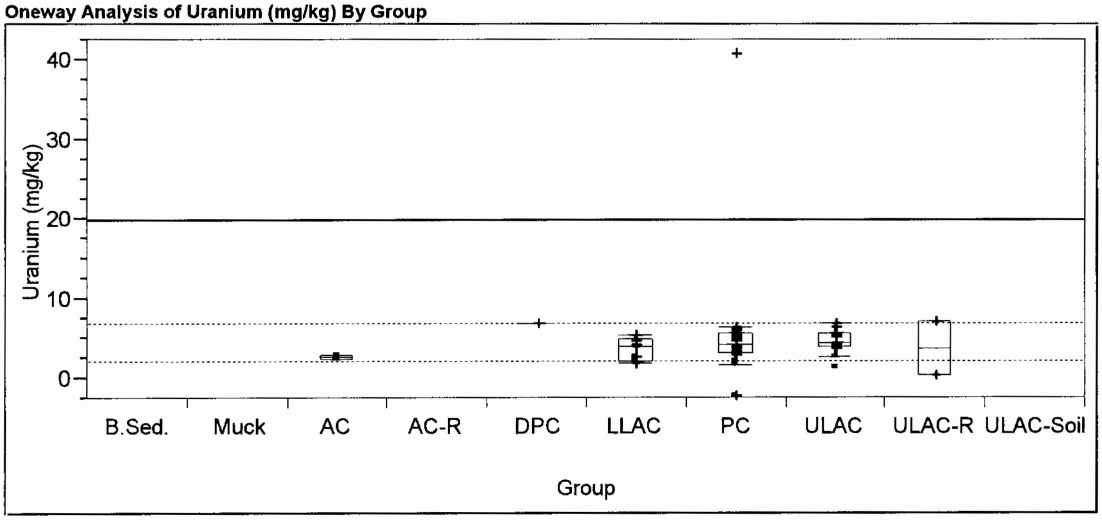


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

Oneway Analysis of Total_Uranium_by_ICPMS (mg/kg) By Group



Oneway Analysis of Uranium (mg/kg) By Group

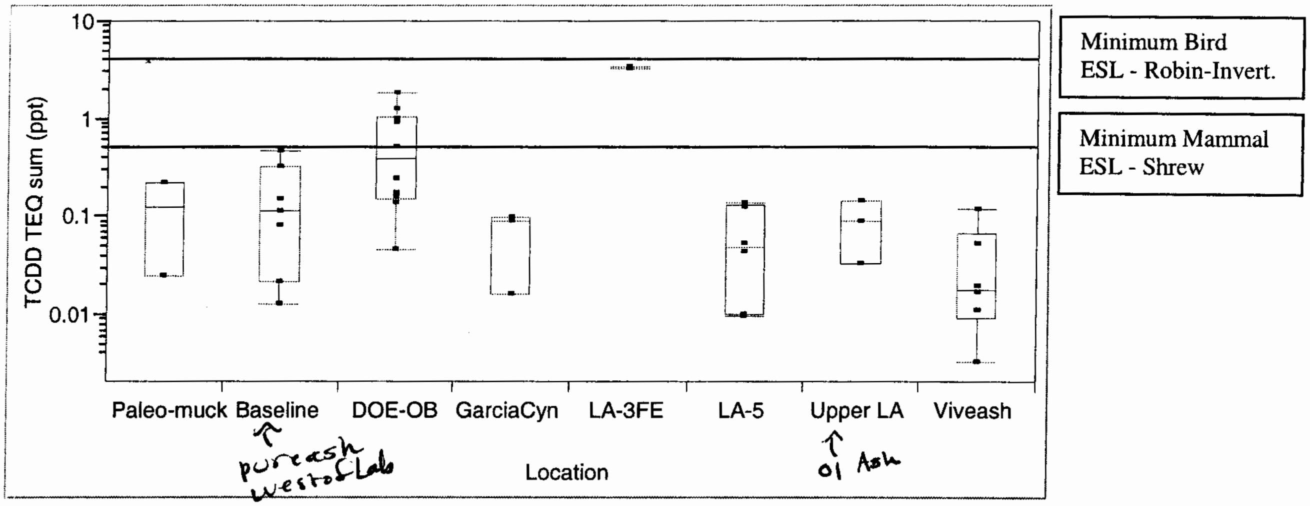


Notes: solid line = final ESL; dashed line = BV; "+" = inactive channel; "square" = c1

Group	name	soil	receptor	sed	receptor	soil COPEC	sed COPEC	max other	max c1	COPC
inorg	Antimony	0.05	Generic pla	0.78	Occult little	yes	yes	3.15	0.96	0
inorg	Arsenic	0.83	Vagrant sh	1.1	Occult little	yes	yes	8.7	5	0
inorg	Barium	2.4	Vagrant sh	3.3	Occult little	yes	yes	280	370	0
inorg	Boron	10	Generic pla	170	Occult little		nd	9.7	nd	0
inorg	Cadmium	0.1	Earthworm	0.59	Aquatic co	yes		3.3	0.59	0
inorg	Calcium	n/a	n/a	n/a	n/a	n/a	n/a	14000	15000	0
inorg	Chromium__Total	1.4	Earthworm	56	Aquatic co	yes		240	26.7	0
inorg	Cobalt	0.051	American r	0.074	Violet-gree	yes	yes	8.6	8.1	0
inorg	Copper	10	Generic pla	28	Aquatic co	yes		64	26	0
inorg	Cyanide__Total	0.1	American r	0.1	Aquatic co	yes	yes	2	2.5	0
inorg	Lead	55	American r	34	Aquatic co	yes	yes	205	107	0
inorg	Manganese	50	Generic pla	720	Aquatic co	yes	yes	1500	2100	0
inorg	Mercury	0.05	Earthworm	0.13	Aquatic co	yes		3.4	0.094	0
inorg	Methylmercury__1__Ion	0.00035	American r	0.00046	Violet-gree	yes	nd	0.002	nd	0
inorg	Nickel	20	Generic pla	39	Aquatic co			20	14	0
inorg	Selenium	0.1	Generic pla	1	Aquatic co	yes	yes	1.5	1.7	0
inorg	Silver	0.05	Generic pla	0.12	Occult little	yes	yes	15.8	0.36	0
inorg	Thallium	0.1	Generic pla	0.44	Occult little	yes	yes	6.7	0.86	0
inorg	Titanium	72	Vagrant sh	98	Occult little	yes	yes	1840	409	0
inorg	Total_Uranium_by_ICPMS	20	American r	29	Violet-gree		n/a	7.1	n/a	0
inorg	Uranium	20	American r	29	Violet-gree	yes		41	4	0
inorg	Zinc	10	Generic pla	130	Violet-gree	yes	yes	390	140	0
pah	Acenaphthene	0.25	Generic pla	0.62	Aquatic co	yes	nd	0.58	nd	0
pah	Anthracene	220	Vagrant sh	0.00039	Aquatic co		yes	1.8	0.069	0
pah	Benzo_a_anthracene	3	Vagrant sh	0.11	Aquatic co		yes	2.6	1.2	0
pah	Benzo_a_pyrene	9.6	Vagrant sh	0.35	Aquatic co			3	0.26	0
pah	Benzo_b_fluoranthene	18	Generic pla	0.24	Aquatic co		yes	5.3	1.7	0
pah	Benzo_g_h_i_perylene	12	Vagrant sh	0.29	Aquatic co			0.86	0.27	0
pah	Benzo_k_fluoranthene	62	Vagrant sh	0.24	Aquatic co			1.1	0.18	0
pah	Chrysene	2.4	Vagrant sh	0.5	Aquatic co	yes	yes	3.1	0.99	0
pah	Dibenz_a_h_anthracene	12	Vagrant sh	0.015	Aquatic co		nd	0.4	nd	0
pah	Fluoranthene	26	Vagrant sh	2.9	Aquatic co			6.3	2.8	0
pah	Fluorene	1.7	Earthworm	0.54	Aquatic co		nd	0.56	nd	0
pah	Indeno_1_2_3_cd_pyrene	62	Vagrant sh	0.078	Aquatic co		yes	1.2	0.24	0
pah	Methylnaphthalene_2__	5.9	Vagrant sh	0.18	Aquatic co		nd	0.34	nd	0
pah	Naphthalene	0.2	American r	0.27	Violet-gree	yes		0.81	0.25	0
pah	Phenanthrene	11	Vagrant sh	0.85	Aquatic co		yes	5.1	2.7	0
pah	Pyrene	15	Vagrant sh	0.57	Aquatic co		yes	5.9	3.6	0
pcb	Aroclor_1254	0.022	Vagrant sh	0.028	Occult little	yes		6.2	0.018	0
pcb	Aroclor_1260	0.44	American r	0.031	Aquatic co	yes		1	0.016	0
pest	Aldrin	n/a	n/a	n/a	n/a	n/a	n/a	0.00211	nd	0
pest	Chlordane_alpha__	2.1	Vagrant sh	0.0005	Aquatic co		yes	0.031	0.0018	0
pest	Chlordane_gamma__	2.1	Vagrant sh	0.0005	Aquatic co		yes	0.0338	0.0031	0
pest	DDD_4_4___	n/a	n/a	n/a	n/a	n/a	n/a	0.092	nd	0
pest	DDE_4_4___	0.0026	American r	0.0022	Aquatic co	yes	nd	0.028	nd	0
pest	DDT_4_4___	0.0026	American r	0.0015	Aquatic co	yes	yes	0.14	0.00599	0
pest	Dieldrin	0.04	Vagrant sh	0.052	Aquatic co		nd	0.03	nd	0
pest	Endrin_Aldehyde	0.0034	Generic pla	0.01	Aquatic co	yes	nd	0.057	nd	0
pest	Heptachlor_Epoxide	0.059	Vagrant sh	0.01	Aquatic co		nd	0.0045	nd	0
rad	Americium_241	44	Earthworm	0.0058	Algae (Aqu		yes	10.671	0.64	0
rad	Americium_241_GS	44	Earthworm	0.0058	Algae (Aqu	yes	yes	88	1	0
rad	Cesium_134	320	Red fox (M	0.47	Fish (Aqua			0.6	0.24	0
rad	Cesium_137	680	Red fox (M	1.1	Fish (Aqua		yes	442	6.27	0
rad	Cobalt_60	550	Earthworm	0.38	Aquatic sn			0.74	0.16	0
rad	Europium_152	380	Earthworm	0.1	Algae (Aqu		yes	3.3	0.408	0
rad	Plutonium_238	44	Earthworm	0.019	Algae (Aqu		yes	3.7	0.086	0
rad	Plutonium_239	47	Earthworm	0.02	Algae (Aqu	yes	yes	502.01	14.74	0
rad	Ruthenium_106	n/a	n/a	n/a	n/a	n/a	n/a	6.5	0.85	0
rad	Sodium_22	3400	Red fox (M	90	Algae (Aqu			0.71	0.11	0
rad	Strontium_90	560	Red fox (M	0.57	Algae (Aqu		yes	32.8	1.39	0
rad	Tritium	36000	Generic pla	220000	Algae (Aqu			3	0.2	0
rad	Uranium_234	51	Earthworm	0.022	Algae (Aqu		yes	7.87	1.68	0

Group	name	soil	receptor	sed	receptor	soil COPEC	sed COPEC	max other	max c1	COPC
rad	Uranium_235	55	Earthworm	0.024	Algae (Aqu		yes	0.278	0.133	0
rad	Uranium_235_GS	55	Earthworm	0.024	Algae (Aqu		yes	0.9	0.1219	0
rad	Uranium_238	55	Earthworm	0.024	Algae (Aqu		yes	6.09	1.69	0
svoc	Benzoic_Acid	7.3	Deer mous	0.065	Aquatic co		yes	1.8	0.75	0
svoc	Bis_2_ethylhexyl_phthalate	1	American r	1.3	Violet-gree	yes		1.7	0.6	0
svoc	Butylbenzylphthalate	340	Vagrant sh	13	Aquatic co		nd	0.5	nd	0
svoc	Carbazole	n/a	n/a	n/a	n/a	n/a	n/a	0.47	0.27	0
svoc	Dibenzofuran	6.1	Generic pl	2.3	Aquatic co		nd	0.4	nd	0
voc	Acetone	3.8	Deer mous	0.065	Aquatic co		n/a	0.25	n/a	0
voc	Butylbenzene_sec__	n/a	n/a	n/a	n/a	n/a	n/a	0.12	n/a	0
voc	Carbon_Disulfide	n/a	n/a	n/a	n/a	n/a	n/a	0.004	n/a	0
voc	Ethylbenzene	n/a	n/a	n/a	n/a	n/a	n/a	0.54	nd	0
voc	Methylene_Chloride	7.1	Deer mous	0.38	Aquatic co		n/a	0.003	n/a	0
voc	Propylbenzene_1__	n/a	n/a	n/a	n/a	n/a	n/a	0.003	n/a	0
voc	Styrene	n/a	n/a	n/a	n/a	n/a	n/a	0.037	n/a	0
voc	Toluene	70	Vagrant sh	0.67	Aquatic co		nd	0.0047	nd	0
voc	Trichlorofluoromethane	n/a	n/a	n/a	n/a	n/a	n/a	0.002	n/a	0
voc	Trimethylbenzene_1_2_4__	n/a	n/a	n/a	n/a	n/a	n/a	2.6	nd	0
pah	Acenaphthylene	160	Vagrant sh	0.044	Aquatic co		nd	0.44	nd	<5%
pest	BHC_alpha__	n/a	n/a	n/a	n/a	n/a	n/a	nd	nd	<5%
pest	BHC_delta__	n/a	n/a	n/a	n/a	n/a	n/a	0.00197	nd	<5%
pest	BHC_gamma__	0.034	Vagrant sh	0.0028	Aquatic co	nd	nd	nd	nd	<5%
pest	Endosulfan_II	0.35	Vagrant sh	0.006	Aquatic co		nd	0.0068	nd	<5%
pest	Endosulfan_Sulfate	0.35	Vagrant sh	0.006	Aquatic co		nd	0.017	nd	<5%
pest	Endrin	0.0034	Generic pl	0.01	Aquatic co	yes	nd	0.015	nd	<5%
svoc	Aniline	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Benzidine	n/a	n/a	n/a	n/a	n/a	n/a	0.38	nd	<5%
svoc	Benzyl_Alcohol	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Bis_2_chloroethoxy_methane	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Bis_2_chloroethyl_ether	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Chloroaniline_4__	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Chloronaphthalene_2__	n/a	n/a	n/a	n/a	n/a	n/a	0.4	nd	<5%
svoc	Chlorophenol_2__	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Chlorophenyl_phenyl_4___Ether	n/a	n/a	n/a	n/a	n/a	n/a	0.4	nd	<5%
svoc	Di_n_butylphthalate	0.17	American r	0.24	Violet-gree	yes	nd	2.1	nd	<5%
svoc	Di_n_octylphthalate	160	Vagrant sh	210	Occult little		nd	0.16	nd	<5%
svoc	Dichlorobenzene_1_2___SVOC	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Dichlorobenzene_1_3___SVOC	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Dichlorobenzene_1_4___SVOC	1.2	Earthworm	0.35	Aquatic co		nd	0.34	nd	<5%
svoc	Dichlorobenzidine_3_3___	n/a	n/a	n/a	n/a	n/a	n/a	0.78	nd	<5%
svoc	Diethylphthalate	n/a	n/a	n/a	n/a	n/a	n/a	0.4	nd	<5%
svoc	Dimethyl_Phthalate	10	Earthworm	340	Occult little		nd	0.4	nd	<5%
svoc	Dimethylphenol_2_4__	n/a	n/a	n/a	n/a	n/a	n/a	nd	nd	<5%
svoc	Dinitro_2_methylphenol_4_6__	n/a	n/a	n/a	n/a	n/a	n/a	9.9	nd	<5%
svoc	Dinitrophenol_2_4__	n/a	n/a	n/a	n/a	n/a	n/a	1.9	nd	<5%
svoc	Dinitrotoluene_2_4__	1	Deer mous	0.29	Aquatic co		nd	0.4	nd	<5%
svoc	Dinitrotoluene_2_6__	0.65	Deer mous	1.4	Occult little		nd	0.4	nd	<5%
svoc	Hexachlorobutadiene	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Hexachlorocyclopentadiene	n/a	n/a	n/a	n/a	n/a	n/a	1.9	nd	<5%
svoc	Hexachloroethane	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Isophorone	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Methylphenol_2__	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Methylphenol_4__	n/a	n/a	n/a	n/a	n/a	n/a	0.34	2	<5%
svoc	Nitroaniline_2__	n/a	n/a	n/a	n/a	n/a	n/a	1.9	nd	<5%
svoc	Nitroaniline_3__	n/a	n/a	n/a	n/a	n/a	n/a	1.9	nd	<5%
svoc	Nitroaniline_4__	n/a	n/a	n/a	n/a	n/a	n/a	1.9	nd	<5%
svoc	Nitrobenzene	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Nitrophenol_4__	n/a	n/a	n/a	n/a	n/a	n/a	1.9	nd	<5%
svoc	Nitroso_di_n_propylamine_N__	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Nitrosodimethylamine_N__	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Oxybis_1_chloropropane__2_2___	n/a	n/a	n/a	n/a	n/a	n/a	0.34	nd	<5%
svoc	Pentachlorophenol	0.032	Generic pl	0.65	Occult little	yes	nd	9.9	nd	<5%

Group	name	soil	receptor	sed	receptor	soil COPEC	sed COPEC	max other	max c1	COPC
svoc	Phenol	0.79	Generic pla	240	Occult little		nd	0.34	nd	<5%
svoc	Pyridine	n/a	n/a	n/a	n/a	n/a	n/a	nd	nd	<5%
svoc	Trichlorobenzene_1_2_4__	1.2	Earthworm	4.5	Occult little		nd	0.34	nd	<5%
svoc	Trichlorophenol_2_4_5__	n/a	n/a	n/a	n/a	n/a	n/a	0.4	nd	<5%
svoc	Trichlorophenol_2_4_6__	n/a	n/a	n/a	n/a	n/a	n/a	9.3	nd	<5%
voc	Xylene__Total_	n/a	n/a	n/a	n/a	n/a	n/a	0.002	nd	<5%
inorg	Aluminum	5	Generic pla	12	Occult little	yes	yes	18400	13000	no
inorg	Beryllium	2.5	Generic pla	4.1	Occult little			1.7	1.7	no
inorg	Bicarbonate__as_CaCO3_	n/a	n/a	n/a	n/a	n/a	n/a	#N/A	#N/A	no
inorg	Bromide	n/a	n/a	n/a	n/a	n/a	n/a	#N/A	#N/A	no
inorg	Chloride	n/a	n/a	n/a	n/a	n/a	n/a	#N/A	#N/A	no
inorg	Iron	n/a	n/a	n/a	n/a	n/a	n/a	36600	16000	no
inorg	Magnesium	n/a	n/a	n/a	n/a	n/a	n/a	3100	2800	no
inorg	Potassium	n/a	n/a	n/a	n/a	n/a	n/a	3740	2400	no
inorg	Sodium	n/a	n/a	n/a	n/a	n/a	n/a	1530	966	no
inorg	Sulfate	n/a	n/a	n/a	n/a	n/a	n/a	#N/A	#N/A	no
inorg	Vanadium	0.025	Generic pla	4.1	Violet-gree	yes	yes	24	22	no
other	Diesel_Range_Organics	n/a	n/a	n/a	n/a	n/a	n/a	#N/A	#N/A	no
other	Gasoline_Range_Organics	n/a	n/a	n/a	n/a	n/a	n/a	#N/A	#N/A	no
other	Stoddard_Solvent	n/a	n/a	n/a	n/a	n/a	n/a	#N/A	#N/A	no
other	Total_Organic_Carbon	n/a	n/a	n/a	n/a	n/a	n/a	#N/A	#N/A	no
pcb	Aroclor_1248	0.0072	Vagrant sh	0.009	Occult little	nd	nd	nd	nd	no
rad	Gross_Alpha_Radiation	n/a	n/a	n/a	n/a	n/a	n/a	1652.17	78.1	no
rad	Gross_Beta_Radiation	n/a	n/a	n/a	n/a	n/a	n/a	137.55	39.44	no
rad	Gross_Gamma_Radiation	n/a	n/a	n/a	n/a	n/a	n/a	24.7	6.1	no
rad	Protactinium_233	n/a	n/a	n/a	n/a	n/a	n/a	n/a	nd	no
rad	Thorium_227	n/a	n/a	n/a	n/a	n/a	n/a	0.035	0.01	no
rad	Thorium_228	43	Earthworm	0.0059	Algae (Aqu		yes	2.9	1.36	no
rad	Thorium_230	52	Earthworm	0.0068	Algae (Aqu		yes	2.61	1.16	no
rad	Thorium_232	6.2	Earthworm	0.00081	Algae (Aqu		yes	2.64	1.3	no
rad	Radium_226	8.1	Earthworm	0.0001	Algae (Aqu	#N/A	#N/A	#N/A	#N/A	no



- Only post-fire samples of ash containing material
- Concentrations of TCDD from various sources
  EPA 2000 Draft Dioxin Reassessment
  - Burning large amounts of PVC
    ≐ 200 to 110,000 ppt → 0.2 to 110 µg TCDD (TEQ) / kg residue
  - Brush fires (grass) - burned vs unburned New Zealand National Park
    2.2 to 36.8 ppt TCDD (TEQ)
  - Burned field
    1.7 to 1.8 ppt TCDD (TEQ)

high levels seen after fire may have come from home PVC and PCB-containing transformers

DOE Oversight

4/11/02

DRAFT

DOE Oversight

SUS pended sediment

Sample ID		Total Dioxin/Furan pg/g	Dioxin TEQ Minimum * pg/g	TEQ Maxi pg/g (← includes n.d. at ½ d.l.)	Residential soil screening level	Industrial soil screening level
LA 11.0 (SS)	Los Alamos Canyon at Skate Rink Gage	145.44	0.435	0.732	3.9 pg/g	23 pg/g
Cananda del Buey @ SR4 (SS)	Cananda del Buey @ SR4	237.72	2.6841	2.8441		
PUN-0.01(SS)	Pueblo Canyon North Tributary upstream from Junction with Pueblo Canyon	84.82	3.0203	3.41305		
PU-6.7(SS)	Pueblo Canyon upstream from Junction with Pueblo Canyon North Tributary	64.48	0.33619	0.78814		
PU-2.0(SS)	Pueblo Canyon Near Bayo Sewage Treatment Plant	175.66	1.13956	1.56811		

* Toxicity Equevalent Quotient (TEQ) minimum is the sum of the products of all Dioxin/Furan detections multiplied by each one's respective Toxic Equivalency Factor (TEF)

SS - Suspended Sediment

** Toxicity Equevalent Quotient (TEQ) maximum is the sum of the products of all Dioxin/Furan detections multiplied by each one's respective Toxic Equivalency Factor (TEF) **PLUS** the sum of all Non-Detects (NDs) [1/2 each respective detection limit times the respective TEF].

DRAFT

Sediment

LA Muck

	Sample ID	Total Dioxin/Furan pg/g	Dioxin TEQ Minimum * pg/g	Dioxin TEQ Maximum ** pg/g	Residential soil screening level	Industrial soil screening level
PA 10.5	Pajrito @ SR501	11.283	0.047	0.368	3.9 pg/g (ppt)	23 pg/g (ppt)
PA 6.7	Pajarito @ Two Mile Canyon	55.251	0.172	0.418		
TW 0.01	Two Mile Canyon @ Pajarito Canyon	295.68	1.86	1.891		
PA 2.2	Pajarito @ SR4	176.117	0.901	1.104		
PA/ASH-0.1	Pajarito Canyon 0.1 mi.upstream from junction with Rio Grande, top layer	289.93	0.9139	1.0279		
PA/ASH-0.1 (D)	Pajarito Canyon 0.1 mi. upstream from junction with Rio Grande, top layer (field duplicate)	270.61	1.0001	1.1456		
WA 2.9	Water Canyon at SR4	36.323	0.157	0.271		
WATER/ASH-0.1	Water Canyon upstream from junction with Rio Grande, top layer	255.65	0.23642	0.60542		
WATER/ASH-0.1A	Water Canyon upstream from junction with Rio Grande, mid layer	154.67	0.52808	1.30353		
WATER/ASH-0.1B	Water Canyon upstream from junction with Rio Grande, bottom layer	58.4	0.13355	1.57305		

* Toxicity Equevalent Quotient (TEQ) minimum is the sum of the products of all Dioxin/Furan detections multiplied by each one's respective Toxic Equivalency Factor (TEF)

** Toxicity Equevalent Quotient (TEQ) maximum is the sum of the products of all Dioxin/Furan detections multiplied by each one's respective Toxic Equivalency Factor (TEF) **PLUS** the sum of all Non-Detects (NDs) [1/2 each respective detection limit times the respective TEF].

DRAFT

Rio Grande sediment samples

Preliminary Data
Rio Grande Raft Trip Sediment Samples

Lab ID	Sample ID	Sample description	Total Dioxin/Furan (pg/g) (pg/g)	Dioxin/furans TEQ Minimum (pg/g)	TEQ Maximum (pg/g)	Total Dioxin Homologues	Total Furan Homologues
009160-01	PA/ASH-01A	Rio Grande above junction with Pajarito, top layer	37.4	0.08987	0.76012	7.4	2.4
009160-02	PA/ASH-02A	Rio Grande above junction with Pajarito, bottom layer	35.5	0.09364	0.80344	10	1.6
009160-05	PA/ASH-01	Rio Grande below junction with Pajarito, top layer	19.67	0.087683	0.348283	5	1
009160-06	PA/ASH-02	Rio Grande below junction with Pajarito, bottom layer	93.05	0.20465	0.5353	11	3
009159-02	WA/ASH-01	Rio Grande below junction with Water Canyon, top layer	41.1	0.09435	0.6821	7.3	ND
009159-03	WA/ASH-02	Rio Grande below junction with Water Canyon, bottom layer	89.21	0.27605	1.00925	16	2.7
009159-04	FR/ASH-01	Rio Grande below junction with Frijoles Canyon, top layer	302.78	0.6509	1.38365	55	13
009159-05	FR/ASH-02	Rio Grande below junction with Frijoles Canyon, mid layer	80.98	0.17674	1.01844	14	4.3
009159-06	FR/ASH-03	Rio Grande below junction with Frijoles Canyon, bottom layer	48.29	0.17672	0.88557	10	1.5
Method Blank	Sodium Sulphate		37.4	0.068	0.77	4	ND
Method Blank	Sea Sand*		16	0.0016	0.2	ND	ND

Method Blank Sea Sand* = Blank used to blank-correct all other values

Dioxins TEQs Data Request 04-09

concentration in all these columns

Reach_RR6	Sample_ID	Begin_Depth	End_Depth	Depth_Units	Geomorphic_Unit	Sediment_Facies	TCDD_TEQ Sum	HPCDBD_123 4678_	TCDBF_2378	HPCDBF_123 4678_	OCDBF_1234 6789_	OCDBD_1234 6789_	TCDBD_2378	HXCDBD_123 478_	HXCDBD_123 678_	HXCDBD_123 789_
Upper LA	CABG-01-0010	0	2	cm	ash		9.2E-08	3.4E-06	1.4E-07	7.1E-07	4.4E-06	3.2E-05	-1.1E-07	-1.6E-07	-1.7E-07	-1.5E-07
Upper LA	CABG-01-0013	0	3	cm	ash		3.3E-08	9.0E-07	2.0E-07	-1.6E-07	-4.1E-07	4.4E-06	-1.1E-07	-1.4E-07	-1.7E-07	-1.4E-07
Upper LA	CABG-01-0016	0	1	cm	ash		1.4E-07	1.6E-06	3.8E-07	-2.0E-07	-6.6E-07	6.0E-06	-1.1E-07	-2.5E-07	-2.9E-07	-2.4E-07
Baseline	CABG-00-0064	0	15	cm	Muck	fine	3.2E-07	4.0E-06	2.6E-07	1.2E-06	2.1E-06	3.2E-05	-8.3E-08	-2.7E-07	-3.0E-07	-2.6E-07
Baseline	CABG-00-0065	0	15	cm	Muck	fine	4.7E-07	7.1E-06	3.4E-07	1.5E-06	2.9E-06	3.7E-05	-9.8E-08	-1.9E-07	4.4E-07	3.4E-07
Baseline	CABG-00-0066	0	15	cm	Ash	fine	1.1E-07	-9.4E-07	2.8E-07	1.7E-07	-4.3E-07	3.5E-06	-9.4E-08	-1.7E-07	-1.8E-07	-1.6E-07
Baseline	CABG-00-0067	0	15	cm	Ash	fine	1.3E-08	-7.1E-07	1.3E-07	-9.2E-08	-3.0E-07	-1.5E-06	-1.0E-07	-1.8E-07	-2.0E-07	-1.8E-07
Baseline	CABG-00-0068	0	15	cm	Ash	fine	8.4E-08	-8.5E-07	2.2E-07	-8.3E-08	-2.5E-07	-2.0E-06	-1.1E-07	-7.5E-08	-8.3E-08	-7.4E-08
Baseline	CABG-00-0069	0	15	cm	Muck	fine	1.5E-07	1.6E-06	2.2E-07	4.9E-07	-6.8E-07	6.9E-06	-8.3E-08	-1.5E-07	-1.7E-07	-1.5E-07
Baseline	CABG-00-0070	0	15	cm	Ash	fine	2.1E-08	-1.1E-06	1.6E-07	1.7E-07	-3.9E-07	4.3E-06	-1.3E-07	-9.9E-08	-1.2E-07	-1.0E-07
GarciaCyn	CABG-00-0088	0	7	cm	f?	fine	9.8E-08	3.5E-06	-2.3E-07	9.2E-07	1.6E-06	2.6E-05	-1.6E-07	-7.0E-07	-8.5E-07	-7.3E-07
GarciaCyn	CABG-00-0089	0	5	cm	f?	fine	8.9E-08	4.3E-06	-3.7E-07	9.8E-07	2.2E-06	3.4E-05	-2.1E-07	-8.9E-07	-1.3E-06	-9.9E-07
GarciaCyn	CABG-00-0090	9	16	cm	f?	fine	1.7E-08	9.8E-07	-2.3E-07	-2.2E-07	-8.1E-07	6.8E-06	-1.1E-07	-3.6E-07	-4.4E-07	-3.7E-07
LA-3FE	CALA-00-0111	0	31	cm	c1	fine	3.5E-06	6.5E-05	9.3E-07	2.0E-05	5.3E-05	6.8E-04	-1.7E-07	1.2E-06	2.8E-06	2.1E-06
LA-3FE	CALA-00-0112	0	3	cm	c1	fine	3.3E-06	5.8E-05	9.8E-07	1.8E-05	4.5E-05	5.5E-04	-1.1E-07	1.1E-06	3.0E-06	2.6E-06
LA-5	CALA-00-0106	21	29	cm	c1b	fine	1.4E-07	2.7E-06	1.6E-07	8.6E-07	1.2E-06	1.7E-05	-6.4E-08	-1.9E-07	-2.1E-07	-1.9E-07
LA-5	CALA-00-0107	0	14	cm	c1b	fine	9.6E-09	5.2E-07	-7.8E-08	-1.9E-07	6.3E-07	3.8E-06	-7.8E-08	-1.7E-07	-1.9E-07	-1.7E-07
LA-5	CALA-00-0108	0	10	cm	c1	coarse	1.0E-08	4.3E-07	-5.1E-08	2.1E-07	5.6E-07	3.5E-06	-4.8E-08	-1.0E-07	-1.2E-07	-1.0E-07
LA-5	CALA-00-0109	13	33	cm	f1	fine	5.3E-08	1.9E-06	1.1E-07	6.7E-07	1.4E-06	1.4E-05	-6.7E-08	-2.0E-07	-2.2E-07	-2.0E-07
LA-5	CALA-00-0110	0	14	cm	f1	fine	4.4E-08	1.9E-06	-1.4E-07	6.8E-07	4.3E-06	1.4E-05	-6.8E-08	-2.3E-07	-2.6E-07	-2.3E-07
LA-5	CALA-00-0113	14	26	cm	f1	fine	1.3E-07	1.7E-06	1.6E-07	5.1E-07	9.6E-07	1.2E-05	-6.6E-08	-1.9E-07	-2.1E-07	-1.8E-07
Viveash-paleo	CABG-00-0078	180	187	cm	f?	fine	2.5E-08	1.0E-06	-1.3E-07	4.8E-07	1.2E-06	-6.8E-06	-1.2E-07	-1.9E-07	-2.1E-07	-1.9E-07
Viveash-paleo	CABG-00-0080	130	137	cm	f?	fine	2.2E-07	6.0E-06	1.7E-07	1.0E-06	4.2E-05	2.6E-05	-3.6E-08	-2.3E-07	3.5E-07	-2.2E-07
Viveash	CABG-00-0082	0	1	cm	f?	fine	3.3E-09	2.5E-07	-6.8E-08	-4.8E-08	8.3E-07	-9.9E-07	-5.4E-08	-1.0E-07	-1.1E-07	-9.9E-08
Viveash	CABG-00-0083	2	10	cm	f?	fine	1.1E-08	7.7E-07	-8.3E-08	3.1E-07	5.2E-07	-4.6E-06	-8.8E-08	-2.1E-07	-2.3E-07	-2.1E-07
Viveash	CABG-00-0084	10	20	cm	f?	fine	1.9E-08	1.4E-06	-1.2E-07	4.6E-07	7.9E-07	-8.5E-06	-5.6E-08	-2.1E-07	-2.2E-07	-2.0E-07
Viveash	CABG-00-0085	24	37	cm	f?	fine	1.2E-07	1.9E-06	-9.1E-08	7.7E-07	1.5E-06	1.6E-05	-7.0E-08	-1.4E-07	-1.6E-07	-1.4E-07
Viveash	CABG-00-0086	0	10	cm	f?	fine	1.7E-08	1.0E-06	-5.9E-08	3.7E-07	3.6E-06	-6.8E-06	-3.9E-08	-1.5E-07	-1.6E-07	-1.5E-07
Viveash	CABG-00-0087	15	25	cm	f?	fine	5.3E-08	1.7E-06	-9.5E-08	6.2E-07	2.4E-06	1.2E-05	-2.9E-08	-1.4E-07	-1.6E-07	-1.4E-07

baseline LA canyon 01

O = highest value of data set. this type has lowest toxicity (lowest TEF.

all units mg/kg in this chart.

All sample results are in units of mg/kg, non-detected samples results are indicated by negative values

Dioxins TEFs Data Request 04-09

Reach_RR6	Sample_ID	PCDBD_12378__	PCDBF_12378__	PCDBF_23478__	HXCDBF_123478__	HXCDBF_123678__	HXCDBF_234678__	HXCDBF_123789__	HPCDBF_1234789__	TEQ_00_Dioxins	TEQ_05_Dioxins	TEQ_00_Furans	TEQ_05_Furans
Upper LA	CABG-01-0010	-1.4E-07	-7.5E-08	-6.8E-08	-1.2E-07	-1.2E-07	-1.5E-07	-1.9E-07	-2.4E-07	6.6E-08	1.8E-07	2.6E-08	7.5E-08
Upper LA	CABG-01-0013	-1.5E-08	-7.9E-08	-7.6E-08	-1.3E-07	-1.3E-07	-1.7E-07	-2.0E-07	-1.9E-07	1.3E-08	9.4E-08	2.0E-08	7.4E-08
Upper LA	CABG-01-0016	-1.6E-07	1.4E-07	1.6E-07	-1.6E-07	-1.7E-07	-1.9E-07	-2.5E-07	-2.1E-07	2.2E-08	1.6E-07	1.2E-07	1.6E-07
Baseline	CABG-00-0064	-1.7E-07	2.2E-07	2.6E-07	3.3E-07	2.2E-07	1.6E-07	-7.2E-08	-1.2E-07	7.2E-08	2.0E-07	2.5E-07	2.5E-07
Baseline	CABG-00-0065	-1.7E-07	2.0E-07	3.1E-07	2.9E-07	1.9E-07	1.8E-07	-4.8E-08	-9.8E-08	1.9E-07	2.9E-07	2.8E-07	2.9E-07
Baseline	CABG-00-0066	-9.1E-08	1.0E-07	1.5E-07	-7.8E-08	-7.4E-08	-7.1E-08	-1.2E-07	-7.4E-08	3.5E-09	1.0E-07	1.1E-07	1.3E-07
Baseline	CABG-00-0067	-1.0E-07	-8.4E-08	-8.5E-08	-7.0E-08	-7.1E-08	-6.8E-08	-1.2E-07	-1.4E-07	0.0E+00	1.1E-07	1.3E-08	5.4E-08
Baseline	CABG-00-0068	-8.6E-08	7.4E-08	1.2E-07	-6.2E-08	-6.2E-08	-5.8E-08	-9.9E-08	-1.2E-07	0.0E+00	9.3E-08	8.4E-08	9.9E-08
Baseline	CABG-00-0069	-8.1E-08	1.1E-07	1.6E-07	2.1E-07	-9.7E-08	-8.3E-08	-1.4E-07	-1.3E-07	2.3E-08	1.1E-07	1.3E-07	1.5E-07
Baseline	CABG-00-0070	-9.9E-08	-1.1E-07	-1.1E-07	-6.1E-08	-6.3E-08	-5.8E-08	-1.0E-07	-8.8E-08	4.3E-09	1.1E-07	1.7E-08	6.3E-08
GarciaCyn	CABG-00-0088	-3.5E-07	-3.4E-07	-3.3E-07	2.7E-07	-1.4E-07	-1.6E-07	-2.3E-07	-3.4E-07	6.1E-08	3.4E-07	3.8E-08	1.7E-07
GarciaCyn	CABG-00-0089	-3.3E-07	-4.1E-07	-5.0E-07	-2.6E-07	-2.3E-07	-2.8E-07	-3.6E-07	-2.9E-07	7.7E-08	4.2E-07	1.2E-08	2.2E-07
GarciaCyn	CABG-00-0090	-1.8E-07	-1.7E-07	-2.0E-07	-1.2E-07	-1.1E-07	-1.4E-07	-1.8E-07	-3.0E-07	1.7E-08	1.7E-07	0.0E+00	9.7E-08
LA-3FE	CALA-00-0111	4.0E-07	3.9E-07	9.7E-07	1.6E-06	1.3E-06	1.5E-06	-3.1E-06	1.7E-06	2.1E-06	2.2E-06	1.3E-06	1.5E-06
LA-3FE	CALA-00-0112	4.9E-07	4.0E-07	9.7E-07	1.6E-06	1.1E-06	1.5E-06	-1.6E-07	1.4E-06	2.0E-06	2.1E-06	1.3E-06	1.3E-06
LA-5	CALA-00-0106	-2.2E-07	-8.7E-08	1.4E-07	-1.2E-07	-1.2E-07	-1.4E-07	-2.0E-07	-1.5E-07	4.3E-08	1.6E-07	9.5E-08	1.3E-07
LA-5	CALA-00-0107	-7.3E-08	-9.2E-08	-8.8E-08	-1.2E-07	-1.3E-07	-1.4E-07	-2.1E-07	-2.7E-07	9.0E-09	9.3E-08	6.3E-10	6.1E-08
LA-5	CALA-00-0108	-9.7E-08	-8.5E-08	-7.6E-08	-7.2E-08	-6.8E-08	-7.7E-08	-1.1E-07	-6.2E-08	7.8E-09	7.2E-08	2.6E-09	4.3E-08
LA-5	CALA-00-0109	-1.8E-07	-1.3E-07	-1.2E-07	-1.3E-07	-1.3E-07	-1.4E-07	-2.0E-07	-9.5E-08	3.4E-08	1.4E-07	1.9E-08	8.3E-08
LA-5	CALA-00-0110	-1.5E-07	-1.4E-07	-1.3E-07	-1.3E-07	-1.3E-07	-1.4E-07	-2.0E-07	-1.3E-07	3.3E-08	1.4E-07	1.1E-08	8.4E-08
LA-5	CALA-00-0113	-3.2E-07	-1.2E-07	1.2E-07	1.7E-07	-8.9E-08	-1.0E-07	-1.5E-07	-1.2E-07	2.8E-08	1.7E-07	9.9E-08	1.2E-07
Viveash-paleo	CABG-00-0078	-9.8E-08	1.7E-07	-1.3E-07	-1.4E-07	-1.4E-07	-1.5E-07	-2.3E-07	-1.3E-07	1.0E-08	1.3E-07	1.4E-08	8.7E-08
Viveash-paleo	CABG-00-0080	-1.3E-07	2.4E-07	-1.1E-07	2.1E-07	-5.0E-08	-5.6E-08	-9.0E-08	-2.4E-07	1.2E-07	2.0E-07	1.0E-07	1.4E-07
Viveash	CABG-00-0082	-5.4E-08	-8.3E-08	-8.0E-08	-4.1E-08	-4.0E-08	-4.5E-08	-7.1E-08	-7.3E-08	2.5E-09	5.9E-08	8.3E-10	3.7E-08
Viveash	CABG-00-0083	-8.5E-08	-7.9E-08	-6.9E-08	-5.1E-08	-4.6E-08	-5.5E-08	-8.1E-08	-9.1E-08	7.7E-09	1.1E-07	3.6E-09	3.9E-08
Viveash	CABG-00-0084	-1.3E-07	-1.1E-07	-9.1E-08	-8.6E-08	-8.5E-08	-9.3E-08	-1.4E-07	-1.0E-07	1.4E-08	1.1E-07	5.4E-09	5.8E-08
Viveash	CABG-00-0085	1.2E-07	-1.0E-07	-9.3E-08	1.5E-07	-4.0E-08	-4.5E-08	-6.9E-08	-9.3E-08	9.4E-08	1.5E-07	2.4E-08	6.3E-08
Viveash	CABG-00-0086	-6.7E-08	-6.5E-08	-5.6E-08	-4.3E-08	-4.4E-08	-4.8E-08	-7.2E-08	-6.1E-08	1.0E-08	7.3E-08	7.4E-09	3.7E-08
Viveash	CABG-00-0087	-5.6E-08	-7.7E-08	-6.8E-08	1.5E-07	-7.1E-08	-7.7E-08	-1.2E-07	-1.1E-07	2.9E-08	8.0E-08	2.4E-08	6.1E-08

All sample results are in units of mg/kg, non-detected samples results are indicated by negative values

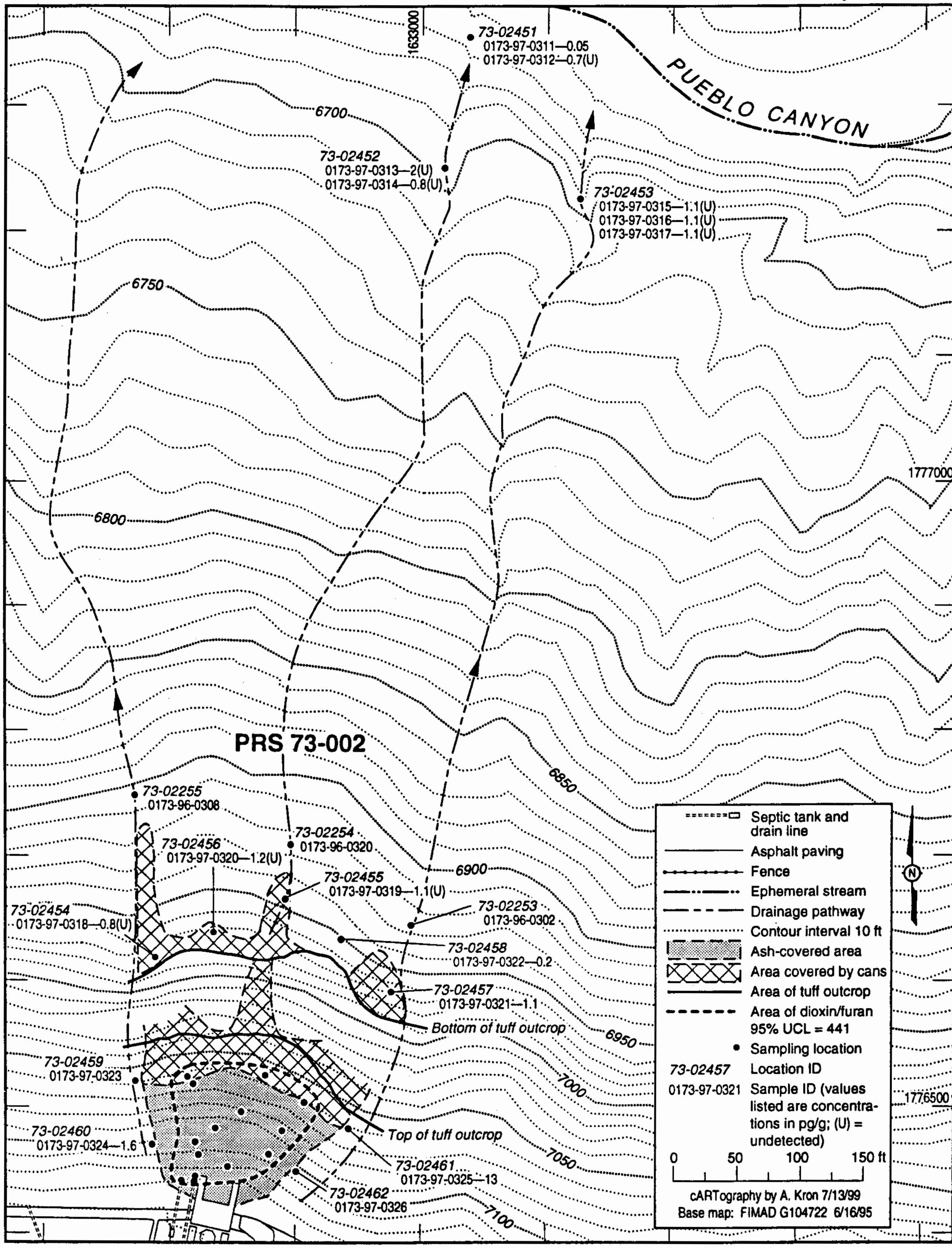


Figure 5. Summary of distribution of dioxin/furan concentrations at PRS 73-002.

Group	name	max other	median	Kestrel	Robin 50:50	Robin invert	Kestrel flesh	Robin herb	Desert cottontail	Deer mouse	Red fox	Vagrant shrew	Invert	Plant
inorg	Antimony	3.15	nd	n/a	n/a	n/a	n/a	n/a	0.51	3.2	0.03	5.5	n/a	63
inorg	Arsenic	8.7	1.8	0.06	0.27	0.46	4E-3	0.09	0.41	5.1	0.09	10	1.3	0.87
inorg	Barium	280	58	0.16	0.74	1.2	0.01	0.28	8.2	62	0.67	117	n/a	2.8
inorg	Cadmium	3.3	nd	0.66	2.5	4.6	0.01	0.38	0.12	2.1	4E-3	3.8	33	3.3
inorg	Chromium__Total	240	5.5	0.05	0.44	0.52	0.02	0.35	0.03	0.11	0.01	0.34	171	100
inorg	Cobalt	8.6	2.4	23	92	169	1.4	19	1.7	45	0.86	95	n/a	34
inorg	Copper	64	7.15	0.02	0.21	0.16	0.00	0.25	0.21	0.38	0.01	0.38	4.9	6.4
inorg	Cyanide__Total	2	nd	3.3	20	20	1.4	20	3E-3	0.01	4E-04	0.01	n/a	n/a
inorg	Lead	205	20	0.41	2.8	3.7	0.08	2.1	0.22	0.93	0.04	2.1	0.10	0.46
inorg	Manganese	1500	255	0.05	0.36	0.39	0.01	0.33	0.88	2.1	0.04	2.9	n/a	30
inorg	Mercury	3.4	0.027	0.12	0.65	0.92	0.05	0.38	1E-3	0.01	8E-4	0.02	68	0.10
inorg	Methylmercury__1__Ion	0.002	0.00018	0.95	2.8	5.7	0.26	0.03	9E-4	0.32	0.02	0.65	8E-4	n/a
inorg	Selenium	1.5	0.07	0.18	0.75	1.4	0.01	0.15	0.03	0.79	0.01	1.6	0.19	15
inorg	Silver	15.8	nd	0.16	0.83	1.1	0.01	0.53	30	113	1.1	174	n/a	316
inorg	Thallium	6.7	nd	n/a	n/a	n/a	n/a	n/a	0.24	9.9	0.24	21	n/a	67
inorg	Titanium	1840	173	n/a	n/a	n/a	n/a	n/a	0.31	12	0.25	26	n/a	n/a
inorg	Uranium	41	4.655	0.27	1.1	2.1	0.01	0.22	0.02	0.71	0.01	1.5	n/a	1.6
inorg	Zinc	390	39.6	0.59	3.0	4.0	0.08	1.9	0.35	1.2	0.03	1.7	1.1	39
pah	Acenaphthene	0.58	nd	n/a	n/a	n/a	n/a	n/a	5E-4	2E-3	7E-05	4E-3	n/a	2.3
pah	Chrysene	3.1	nd	n/a	n/a	n/a	n/a	n/a	0.26	0.76	0.12	1.3	n/a	n/a
pah	Naphthalene	0.81	nd	0.62	3.2	4.1	0.07	2.4	2E-3	5E-3	9E-05	0.01	n/a	n/a
pcb	Aroclor_1254	6.2	nd	36	78	151	28	4.4	2.2	138	41	282	n/a	0.62
pcb	Aroclor_1260	1	nd	0.56	1.2	2.3	0.45	0.07	0.001515	0.10	0.03	0.20	n/a	n/a
pest	DDE_4_4___	0.028	nd	3.4	5.4	11	3.8	0.22	2E-5	2E-3	1E-3	4E-3	n/a	n/a
pest	DDT_4_4___	0.14	0.00605	15	27	54	15	1.2	7E-4	0.07	0.03	0.14	n/a	0.04
pest	Endrin_Aldehyde	0.057	nd	0.83	2.7	5.2	0.36	0.67	0.01	0.16	0.02	0.30	n/a	17
rad	Americium_241_GS	88	0.198	3E-3	0.02	0.02	1E-3	0.01	3E-3	3E-3	3E-3	3E-3	2.0	4E-3
rad	Plutonium_239	502.01	1.33	0.01	0.24	0.24	3E-3	0.06	3E-3	3E-3	0.02	5E-3	11	3E-3
svoc	Bis_2_ethylhexyl_phthalate	1.7	nd	0.74	0.89	1.7	1.0	0.07	5E-4	0.03	0.03	0.06	n/a	n/a

n/a = ESL not available
nd = not detected

ESL soil

Suite	Analyte	Receptor	Test organism	TRV	TRV units	TRV type	LANL TRV	Ref ID	Exposure Route	TRV data source	Value updated	Derivation notes	UF notes	TRV calculation
INORG	Antimony	Plant	Plant	5.00E-02	mg/kg	chronic NOEC	YES	0095	USOIL	LANL derived value based on secondary data	9/28/2001	This chronic NOEC of 0.05 mg/kg for an unspecified phytotoxic effect is based on a LOEC of 5 mg/kg. An unspecified species of plant was exposed to Sb by root uptake from surface soil. The duration of the study is unknown, but to be conservative it is assumed to be less than chronic. This was the only data available for Sb phytotoxicity and it is reported as not being from a primary reference. Ref ID 0105 as cited in Ref ID 0094 states that Sb is a non-essential metal and is easily taken up by plants in soluble form in soil. The value used to derive the TRV was selected because it was the only value available.	Acute or Subchronic LOAEL to Chronic NOAEL UF = 0.01	Chronic NOAEL = 0.01(Acute or Subchronic LOAEL)
INORG	Antimony	Plant	Plant	5.00E-01	mg/kg	chronic NOAEL	NO	0716	soil	EPA Region VI Screening value	6/30/1999	Chronic NOAEL is based upon a generic secondary data source toxicity value.	UF of 0.1 applied.	Chronic NOAEL = 0.1(generic toxicity value) where general toxicity value is 5 mg/kg
INORG	Antimony	Plant	Plant	5.00E+00	mg/kg	ORNL benchmark	NO	0094	soil	ORNL value	2/1/1999	Based on a LOEC of 5 ppm from the work of Kabata-Pendias and Pendias, 1984	Low confidence in the benchmark because it is based on a value reported in a secondary data source and the toxic effects were not reported	N/A
INORG	Antimony	Mammal	Mouse	1.25E-01	mg/kg/d	chronic NOAEL	YES	344	OW	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 0.125 mg/kg/d for effects on lifespan and longevity is based on a chronic LOAEL of 1.25 mg/kg/d, which is based on a drinking water concentration of 5 ppm. Mice were exposed to the chemical in their drinking water over their lifetime at one dose level (5 ppm). Median lifespan of female mice was reduced with an exposure of 5 ppm. Both body weight and water consumption rate used to calculate the effect level were taken from a data source other than the mentioned study.	LOAEL to NOAEL UF = 0.1	Chronic NOAEL = 0.1(Chronic LOAEL)
INORG	Antimony	Mammal	Rat	6.60E-02	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (4 year) LOAEL for mortality.	UF of 10 applied.	Chronic NOAEL = Chronic LOAEL/ UF = 0.66 mg/kg bw/d / 10 = 0.066 mg/kg bw/d
INORG	Arsenic	Invertebra	Earthworm (Eisenia foetida)	6.80E+00	mg/kg	chronic NOEC	YES	97	O/D	LANL derived value based on secondary data	2/1/1999	This chronic NOEC of 6.8 mg/kg for effects on reproduction (cocoons/ worm) is based on a chronic LOEC of 68 mg/kg. The 5 week old earthworm (Eisenia foetida) was exposed to As orally/ dermally in a soil/ manure mix for 56 days. A 56% decline in cocoons/worm was observed at 68 mg/kg As (LCT) compared to control. This experiment was the only one available. The value used to derive the TRV was the only one available.	LOEC to NOEC UF = 0.1	Chronic NOEC = 0.1(Chronic LOEC)
INORG	Arsenic	Invertebra	Earthworm	6.00E+01	mg/kg	ORNL benchmark	NO	96	soil	ORNL value	2/1/1999	based on a dose level of 68 ppm As	Low confidence in the benchmark because the value was based on one study	N/A
INORG	Arsenic	Invertebra	Earthworm (Eisenia fetida)	2.50E-01	mg/kg	chronic NOAEL	NO	716	soil	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon reduced cocoon production reported at a single concentration tested in a chronic (56 day) study.	UF of 100 applied.	Chronic NOAEL = Chronic STC/ UF = 25 mg/kg / 100 = 0.25 mg/kg
INORG	Arsenic	Mammal	Mouse	1.26E-01	mg/kg/d	chronic NOAEL	YES	344	OW+D	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 0.126 mg/kg/d for reproductive effects is based on a chronic LOAEL of 1.26 mg/kg/d, which is based on a drinking water concentration of 5 ppm plus a dietary concentration of 0.06 ppm. Mice were exposed to the chemical in their drinking water and food for three generations including during a critical life stage (reproduction) at one dose level (5 ppm in water + 0.06 ppm in food). A decrease in litter size with each successive generation was observed with an exposure of 5 ppm in drinking water and 0.06 ppm in food. Both body weight and water consumption rate used to calculate the effect level were taken from a data source other than the mentioned study.	LOAEL to NOAEL UF = 0.1	Chronic NOAEL = 0.1(Chronic LOAEL)
INORG	Arsenic	Mammal	Dog	1.25E+00	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (2 year) NOAEL.	No UF applied.	None.

Suite	Analyte	Receptor	Test organism	TRV	TRV units	TRV type	LANL TRV	Ref ID	Exposure Route	TRV data source	Value updated	Derivation notes	UF notes	TRV calculation
INORG	Barium	Mammal	Rat, Long-Evans (BLU:LE) strain	5.40E-01	mg/kg/d	Chronic NOAEL	YES	903	OW	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOAEL of 0.54 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 3 references, 4 experiments, and 8 effects. Endpoints considered in the selection included hypertension, survival of juvenile organisms, development of juvenile organisms, and tumors. The PTV chosen for derivation of the TRV is from Ref ID 0173 and is based on survival in terms of lifespan and longevity (Experiment Effect ID 0173_BA_1B). The resulting TRV is considered protective of wildlife populations because without sufficient numbers of animals surviving to reproduce, the population will begin to decline. The nominal exposure level used for the TRV was the only concentration tested in the study (Ref ID 0173).□ □ In this chronic (lifetime) study, barium acetate was administered orally by way of drinking water to male and female Long-Evans (BLU:LE) strain weanling rats. This test exposure route is related to the exposure route of concern for soil ESLs only by way of both oral exposures and potential ingestion of water with soil. Because the bioavailability of the chemical may vary when in diet than when in the drinking water; the TRV may be more or le	The toxicity reference value (TRV) is based on a no observed adverse effect level, and the exposure period covers the life of the animal. Therefore, the application of an uncertainty factor is unnecessary.	An allometric formula (Ref ID 0561; Section 3.2.2, page 3-10) based on measured body weight was used to calculate water intake in mg/kg/d (WIR (kg/kg/d) =(0.99(BW in kg^0.90)) / Wt (kg) converted to mg/kg/d)).
INORG	Barium	Mammal	Rat	5.10E+00	mg/kg/d	chronic NOAEL	NO	344	diet	LANL value based on secondary data	2/1/1999	(see PTV information)	(see PTV information)	(see PTV information)
INORG	Barium	Mammal	Rat	5.10E-01	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (16 month) NOAEL.	No UF applied.	None.
INORG	Barium	Mammal	Rat, Long-Evans (BLU:LE) strain	5.40E-01	mg/kg/d	Chronic NOAEL	YES	903	OW	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOAEL of 0.54 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 3 references, 4 experiments, and 8 effects. Endpoints considered in the selection included hypertension, survival of juvenile organisms, development of juvenile organisms, and tumors. The PTV chosen for derivation of the TRV is from Ref ID 0173 and is based on survival in terms of lifespan and longevity (Experiment Effect ID 0173_BA_1B). The resulting TRV is considered protective of wildlife populations because without sufficient numbers of animals surviving to reproduce, the population will begin to decline. The nominal exposure level used for the TRV was the only concentration tested in the study (Ref ID 0173).□ □ In this chronic (lifetime) study, barium acetate was administered orally by way of drinking water to male and female Long-Evans (BLU:LE) strain weanling rats. This test exposure route is related to the exposure route of concern for soil ESLs only by way of both oral exposures and potential ingestion of water with soil. Because the bioavailability of the chemical may vary when in diet than when in the drinking water; the TRV may be more or le	The toxicity reference value (TRV) is based on a no observed adverse effect level, and the exposure period covers the life of the animal. Therefore, the application of an uncertainty factor is unnecessary.	An allometric formula (Ref ID 0561; Section 3.2.2, page 3-10) based on measured body weight was used to calculate water intake in mg/kg/d (WIR (kg/kg/d) =(0.99(BW in kg^0.90)) / Wt (kg) converted to mg/kg/d)).
INORG	Barium	Mammal	Rat	5.10E+00	mg/kg/d	chronic NOAEL	NO	344	diet	LANL value based on secondary data	2/1/1999	(see PTV information)	(see PTV information)	(see PTV information)
INORG	Barium	Mammal	Rat	5.10E-01	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (16 month) NOAEL.	No UF applied.	None.
INORG	Barium	Bird	Chicken	9.20E+01	mg/kg/d	Chronic NOAEL	YES	903	OD	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOAEL of 92 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 1 reference, 1 experiment, and 4 effects. Effects considered in the selection included subchronic and acute mortality and growth. The PTV chosen for the derivation of the toxicity reference value (TRV) is from Ref ID 0484 and is based on growth in terms of weight gain of a developing bird (Experiment Effect ID 0484_BA_3A). The resulting TRV is considered protective of wildlife populations because growth may be impaired in such a way so as to depress performance in solicitation of mates and breeding, and therefore lead to a potential decline in population. The exposure level used for the PTV was the fourth highest (2000 ppm) of eight nominal exposure concentration administered.□ □ In this chronic (4 weeks during critical life stage*) study, barium hydroxide was administered orally in food to female chicken hatchlings. This test exposure route is related to the exposure route of concern for soil ESLs (food web transfer by way of consumption of contaminated plants or animals) because both are oral through diet. The 2000 ppm barium c	Because the exposure was chronic during a critical life stage, and the TRV is based on a no observed adverse effects level, the application of an Uncertainty Factor is unnecessary.	N/A
INORG	Barium	Bird	Chicken	2.10E+01	mg/kg/d	chronic NOAEL	NO	344	diet	LANL value based on secondary data	2/1/1999	(see PTV information)	(see PTV information)	(see PTV information)
INORG	Barium	Bird	Chicken	2.00E+01	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a subchronic (4 week) NOAEL.	UF of 10 applied.	Chronic NOAEL = Subchronic NOAEL/ UF = 208.26 mg/kg bw/d / 10 = 20.8 mg/kg bw/d

Suite	Analyte	Receptor	Test organism	TRV	TRV units	TRV type	LANL TRV	Ref ID	Exposure Route	TRV data source	Value updated	Derivation notes	UF notes	TRV calculation
INORG	Cadmium	Invertebrate	Earthworm (Aporrectodea caliginosa)	1.00E-01	mg/kg	chronic NOEC	YES	97	O/D	LANL derived value based on secondary data	9/28/2001	This chronic NOEC of 0.1 mg/kg for effects on reproduction (cocoon production) is based on a chronic LOEC of 10 mg/kg. The earthworm (Aporrectodea caliginosa) was exposed to Cd orally/ dermally in Egyptian soil for 56 days. A 25% reduction in cocoon production was observed at 10 mg/kg (LCT). This experiment was selected from a data pool of 17 available experiments (7 chronic NOECs with accompanying LOECs, 4 chronic LOECs, 4 chronic EC50s and 2 chronic LC50s). The chronic NOECs with accompanying LOECs not selected were for effects on reproduction of the earthworm (Dendrobaena rubida) in a soil/ manure mix at pH 5, 6 or 7 (All had NOEC = 10 and LOEC = 100 mg/kg); growth of the earthworm (Eisenia andrei) in OECD soil with the food source provided in a center hole in the soil (NOEC = 32 and LOEC = 100 mg/kg) or mixed in with the soil (NOEC = 10 and LOEC = 32 mg/kg); reproduction of the earthworm (Eisenia andrei) in OECD soil (NOEC = 10 and LOEC = 108 mg/kg); and survival of the earthworm (Lumbricus rubellus) in sandy loam (NOEC = 150 and LOEC = 1000 mg/kg). The chronic LOECs not selected were for effects o	LOEC to NOEC UF = 0.1	Chronic NOEC = 0.1(Chronic LOEC)
INORG	Cadmium	Invertebrate	Earthworm	2.00E+01	mg/kg	ORNL benchmark	NO	96	soil	ORNL value	2/1/1999	based on estimating the 10th percentile of 18 LOEC values	Moderate confidence in the benchmark	Calculated the 10th percentile of 18 LOEC values
INORG	Cadmium	Invertebrate	Earthworm (Dendrobaena rubida)	1.00E+01	mg/kg	chronic NOAEL	NO	716	soil	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (4 month) NOAEL for cocoon production.	No UF applied.	None.
INORG	Cadmium	Mammal	Rat	1.00E+00	mg/kg/d	chronic NOAEL	YES	344	OG	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 1 mg/kg/d for reproductive effects is accompanied by a chronic LOAEL of 10 mg/kg/d. Rats were exposed to the chemical by oral gavage for six weeks through mating and gestation, a critical life stage (reproduction), at four dose levels (0, 0.1, 1.0 and 10 mg/kg/d). Fetal implantations were reduced by 28%, fetal survivorship was reduced by 50%, and fetal resorptions were increased by 400% in the 10 mg/kg/d group. No effects were observed in other groups.	No UFs applied.	None
INORG	Cadmium	Mammal	Mouse	4.17E-02	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (> 50 day) LOAEL for mortality.	UF of 10 applied.	Chronic NOAEL = Chronic LOAEL/ UF = 0.417 mg/kg bw/d / 10 = 0.0417 mg/kg bw/d
INORG	Cadmium	Bird	Duck, Mallard	1.45E+00	mg/kg/d	chronic NOAEL	YES	344	OD	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 1.45 mg/kg/d for reproductive effects is based on a dietary concentration of 15.2 ppm and has an accompanying chronic LOAEL of 20 mg/kg/d based on a dietary concentration of 210 ppm. Mallard ducks were exposed to the chemical in their diet for 90 days including during a critical life stage (reproduction) at three dose levels (1.6, 15.2 and 210 ppm). A significant decrease in egg production was observed in 210 ppm group compared to other groups. Both the body weight and food consumption rate used to calculate the effect levels are from this study.	No UFs applied.	None
INORG	Cadmium	Bird	Duck, Drake Mallard	1.13E+01	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (90 day) NOAEL.	No UF applied.	None.
INORG	Cadmium	Plant	Spruce, Sitka	1.00E+00	mg/kg	chronic NOEC	YES	95	USOIL	LANL derived value based on secondary data	2/1/1999	This chronic NOEC of 1 mg/kg for effects on development (root and shoot weights) has an accompanying LOEC of 2 mg/kg. 4 week old Sitaka-spruce seedlings were exposed to Cd for 98 days by root uptake of the chemical from soil (acidic peaty gley soil and sand). Cd was added to the soil as cadmium chloride. Seven dose levels were tested (0.1, 0.4, 1, 2, 4, 8 and 16 mg/kg Cd). 2 mg/kg caused a 45% reduction in root and shoot weights of seedlings. This experiment was selected from 74 available experiments (28 NOECs with accompanying LOECs, 39 LOECs, 6 EC50s (Ref ID 0094 categorized these EC50s as LOECs and also provided a NOEC for each one) and 1 without a useable effect level). The number of experiments are too numerous to describe here, please refer to the ORNL benchmark documentation (Ref ID 0094) for details on the experiments not selected. Ref IDs 1143 and 1144 as cited in Ref ID 0094 state that Cd is a non-essential element for plant growth, but it is readily taken up by roots and translocated through the plant and accumulated. Cd is similar to Zn (an essential element) and they compete for organic ligands	No UFs applied.	None
INORG	Cadmium	Plant	Plant	4.00E+00	mg/kg	ORNL benchmark	NO	94	soil	ORNL value	2/1/1999	based on estimating the 10th percentile of 74 LOEC values	High confidence in the benchmark because it is based on a large amount of data	Calculated the 10th percentile of 74 LOEC values
INORG	Cadmium	Plant	Spruce	2.00E-01	mg/kg	chronic NOAEL	NO	716	soil	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic LOAEL for seedling growth.	UF of 10 applied.	Chronic NOAEL = Chronic LOAEL/ UF = 2 mg/kg / 10 = 0.2 mg/kg

Suite	Analyte	Receptor	Test organism	TRV	TRV units	TRV type	LANL TRV	Ref ID	Exposure Route	TRV data source	Value updated	Derivation notes	UF notes	TRV calculation
INORG	Chromium (total)	Invertebra	Earthworm (Octochaetus pattoni	1.40E+00	mg/kg	chronic NOEC	YES	97	O/D	LANL derived value based on secondary data	9/28/2001	This value is based on the methods of USEPA Region 6 for deriving a TRV for chromium (total) for human health medium-specific screening values, which assumes that the ratio of Cr VI to Cr III in a given environmental sample is 1:6. Cr VI is orders of magnitude more toxic than Cr III and because there is only an assumed 6-fold concentration difference between the valence states in a given environmental sample, the toxicity of Cr VI is the driving factor in the development of the TRV for Cr (total). The TRV for Cr (total) is derived by assuming that Cr VI is 1/7 of the concentration of Cr (total) in a given sample; thus the concentration of Cr VI can be considered diluted by a factor of 7 in the Cr (total) concentration. Therefore, increasing the TRV for Cr VI by a factor of 7 provides a TRV protective of both Cr VI and Cr III toxicity by adjusting for the likely concentration of the more toxic Cr VI in the Cr (total) value. (Ref ID 1179). In this case, the TRV for chromium (total) is equal to 7x the chromium VI TRV.	Refer to Chromium VI.	Chromium (total) TRV = 7 x (chromium VI TRV) = 7(0.2 mg/kg) = 1.4 mg/kg
INORG	Chromium (total)	Invertebra	Earthworm	1.00E+00	mg/kg	LANL NOEC	NO	575	soil	LANL derived value based on secondary data	2/1/1999			
INORG	Chromium (total)	Plant	Lettuce	2.45E+00	mg/kg	chronic NOEC	YES	95	USOIL-SO	LANL derived value based on secondary data	9/28/2001	This value is based on the methods of USEPA Region 6 for deriving a TRV for chromium (total) for human health medium-specific screening values, which assumes that the ratio of Cr VI to Cr III in a given environmental sample is 1:6. Cr VI is orders of magnitude more toxic than Cr III and because there is only an assumed 6-fold concentration difference between the valence states in a given environmental sample, the toxicity of Cr VI is the driving factor in the development of the TRV for Cr (total). The TRV for Cr (total) is derived by assuming that Cr VI is 1/7 of the concentration of Cr (total) in a given sample; thus the concentration of Cr VI can be considered diluted by a factor of 7 in the Cr (total) concentration. Therefore, increasing the TRV for Cr VI by a factor of 7 provides a TRV protective of both Cr VI and Cr III toxicity by adjusting for the likely concentration of the more toxic Cr VI in the Cr (total) value. (Ref ID 1179). In this case, the TRV for chromium (total) is equal to 7x the chromium VI TRV.	Refer to Chromium VI.	Chromium (total) TRV = 7 x (chromium VI TRV) = 7(0.35 mg/kg) = 2.45 mg/kg
INORG	Cobalt	Bird	Chicken	2.00E-02	mg/kg/d	chronic NOAEL	YES	575	O	LANL derived value based on secondary data	2/1/1999	This chronic NOAEL of 0.02 mg/kg/d for an unspecified type of toxicity is based on an acute NOAEL of 2 mg/kg/d. Chickens were exposed to the chemical orally. No further study details were reported.	Acute to Chronic UF= 0.01	Chronic NOAEL = 0.01(Acute NOAEL)
INORG	Cobalt	Mammal	Sheep	2.00E-02	mg/kg/d	chronic NOAEL	YES	575	O	LANL derived value based on secondary data	9/28/2001	This chronic NOAEL of 0.02 mg/kg/d for an unspecified type of toxicity is based on an acute NOAEL of 2 mg/kg/d. Sheep were exposed to the chemical orally. No further study details were reported.	Acute to Chronic UF= 0.01	Chronic NOAEL = 0.01(Acute NOAEL)
INORG	Cobalt	Plant	Plant	2.50E-01	mg/kg	chronic NOEC	YES	95	USOIL	LANL derived value based on secondary data	9/28/2001	This chronic NOEC of 0.25 mg/kg for an unspecified phytotoxic effect is based on a LOEC of 25 mg/kg. An unspecified species of plant was exposed to Co by root uptake from surface soil. The duration of the study is unknown, but to be conservative it is assumed to be less than chronic. This was the only data available for Co phytotoxicity and it is reported as not being from a primary reference. Ref ID 1146 as cited in Ref ID 0094 states that Co is not known to be essential to plants, except legumes in symbiosis with N2-fixing microorganisms. Co is translocated from the roots into the xylem as Co(II) ion. Ref ID 0628 as cited in Ref ID 0094 states that Co toxicity is similar to Fe deficiency induced by chlorosis and necrosis and root tip damage. Ref ID 1140 as cited in Ref ID 0094 states that Co appears to be involved with the inhibition of mitosis and with chromosome damage. The value used to derive the TRV was selected because it was the only value available.	Acute or Subchronic LOAEL to Chronic NOAEL UF = 0.01	Chronic NOAEL = 0.01(Acute or Subchronic LOAEL)
INORG	Cobalt	Plant	Plant	2.00E+01	mg/kg	ORNL benchmark	NO	94	soil	ORNL value	2/1/1999	Based on a LOEC of 20 ppm from the work of Kabata-Pendias and Pendias, 1984	Low confidence in the benchmark because it is based on a value from a secondary data source and the toxic effects were not reported	N/A
INORG	Cyanide (total)	Bird	Kestrel, American	4.00E-02	mg/kg/d	chronic NOAEL	YES	575	O	LANL derived value based on secondary data	2/1/1999	This chronic NOAEL of 0.04 mg/kg/d for mortality is based on an acute LD50 of 4 mg/kg/d. American kestrels were exposed to the chemical orally. No further study details were reported.	Acute LD50 to Chronic NOAEL UF = 0.01	Chronic NOAEL = 0.01(Acute LD50)
INORG	Cyanide (total)	Bird	Kestrel, American	4.00E-02	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon an acute LD50.	UF of 100 applied.	Chronic NOAEL = Acute LD50/ UF = 4 mg/kg bw/d / 100 = 0.04 mg/kg bw/d

Suite	Analyte	Receptor	Test organism	TRV	TRV units	TRV type	LANL TRV	Ref ID	Exposure Route	TRV data source	Value updated	Derivation notes	UF notes	TRV calculation
INORG	Lead	Bird	Kestrel, American	5.51E+00	mg/kg/d	Chronic NOAEL	YES	903	OD	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOAEL of 5.51 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 4 references, 4 experiments, and 8 effects. Effects considered in the selection included body weights, organ weights, blood chemistry, growth, lethality, and reproduction. The PTV chosen for the derivation of the toxicity reference value (TRV) is from Ref ID 0187 and is based on reproductive effects such as clutch size, interval between eggs, date of first egg laid, fertility, and eggshell thickness (Experiment Effect ID 0187_PB_1A). Only two empirical exposure levels (wet weight) were administered, and the NOAEL is derived from the higher one. The resulting TRV is considered protective of wildlife populations because the poorer the reproductive quality of the organism, the lower the success of breeding and therefore less individuals to maintain a viable population. □ □ In this chronic (5 to 7 months) study, lead was administered orally through food to one- to six-year-old male and female American kestrels. This test exposure route is related to the exposure route of concern for soil ESLs (food web transfer by way of consumption of contam □ Data on food intake rates were not provided in this study, therefore, food intake rate is based	The toxicity reference value (TRV) is based on no observed adverse reproductive effects and the chronic exposure period covers a critical life stage of the animal. Therefore, the application of an uncertainty factor is unnecessary.	N/A
INORG	Lead	Bird	Dove, Ringed turtle	2.50E-01	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon an acute (7 day) LOAEL for altered enzyme levels.	UF of 100 applied.	Chronic NOAEL = Acute LOAEL/ UF = 25 mg/kg bw/d / 100 = 0.25 mg/kg bw/d
INORG	Lead	Bird	Kestrel, American	3.90E+00	mg/kg/d	chronic NOAEL	NO	344	diet	LANL value based on secondary data	2/1/1999	(see PTV information)	(see PTV information)	(see PTV information)
INORG	Lead	Mammal	Rat	5.81E+00	mg/kg/d	Chronic NOAEL	YES	903	OD	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOAEL of 5.81 mg/kg/d with an accompanying LOAEL of 22.6 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 3 references, 5 experiments, 12 effects. Effects considered in the selection included death and abnormalities, number of pregnant animals, number of pups born alive, and other similar reproductive effects. The PTV chosen for the derivation of the toxicity reference value is from Ref ID 0186 and is based on mortality (Experiment Effect ID 0186_PB_1A). The resulting TRV is considered protective of wildlife populations because the less animals present, the less opportunities for breeding and perpetuation of the population. The exposure level used for the TRV was the second highest of four empirical concentrations tested. □ In this chronic (2 years) study, lead was administered orally through food to adult male and female rats (type not specified). This test exposure route is related to the exposure route of concern for soil ESLs (food web transfer by way of consumption of contaminated plants and/or animals) because both are oral through the diet. Male rats experienced 29% mortality	The toxicity reference value (TRV) is based on no observed adverse survival effects and the exposure period covers two years of the life of the animal. Therefore, the application of an uncertainty factor is unnecessary.	N/A
INORG	Lead	Mammal	Mouse	6.25E-01	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (>150 day) LOAEL for mortality.	UF of 10 applied.	Chronic NOAEL = Chronic LOAEL/ UF = 6.25 mg/kg bw/day / 10 = 0.625 mg/kg bw/d
INORG	Lead	Mammal	Rat	8.00E+00	mg/kg/d	chronic NOAEL	NO	344	diet	LANL value based on secondary data	2/1/1999	(see PTV information)	(see PTV information)	(see PTV information)
INORG	Manganese	Plant	Bean, Bush	5.00E+01	mg/kg	Chronic NOEC	YES	715	USOIL	LANL derived value based on reviewed primary data	9/28/2001	The chronic LOEC of 500 mg/kg for the growth effect of yield per bush bean plant based on stem weight (Experiment Effect ID 0240_MN_1A) is used as the soil TRV for deriving the soil ESL for manganese in plants. This is the only effect from one reference and one experiment currently available from the primary literature for manganese and plants, and it was derived from the lowest of three nominal concentrations. Therefore, the chronic NOEC of 50 mg/kg calculated from this (see Uncertainty Factor section) may be more or less conservative. □ □ Ref ID 0240 only investigated the effects of manganese on plant yield (stems and leaves) as the effect parameter. The effect on leaves was not as sensitive as the effect on the stems. The effect of stem yield per plant was chosen because it was the most sensitive effect measured in this study. It is not clear whether this effect would ultimately influence the ability of the plant to reproduce. □ □ In this chronic (14 days) study, manganese was administered to soil and impact on growth	Because a NOEC is not available for this study, a LOEC to NOEC Uncertainty Factor of 0.1 is applied derive the final TRV, chronic NOEC of 50 mg/kg soil.	Chronic NOEC = 0.1(Chronic LOEC)
INORG	Manganese	Plant	Bean, Bush	5.00E+01	mg/kg	LANL NOEC	NO	95	soil	ORNL value	2/1/1999	LOEC based on growth and yield effects and selected because it was the only available value	LOEC to NOEC UF = 0.1 and only study	NOEC =00.1 LOEC where LOEC = 500 mg/kg
INORG	Manganese	Plant	Plant	5.00E+02	mg/kg	ORNL benchmark	NO	94	soil	ORNL value	2/1/1999	Based on a LOEC of 500 ppm from the work of Wallace et al., 1977	Low confidence in the benchmark because it is based on a single study	N/A

Suite	Analyte	Receptor	Test organism	TRV	TRV Units	TRV type	LANL TRV	Ref ID	Exposure Route	TRV data source	Value updated	Derivation notes	UF notes	TRV calculation
INORG	Manganese	Mammal	Rat, Long-Evans	4.40E+01	mg/kg/d	Chronic NOAEL	YES	715	OD	LANL derived value based on reviewed primary data	6/30/1999	The chronic NOAEL 44 mg/kg/d with an accompanying chronic LOAEL of 158 mg/kg/d for the reproductive effect of percent pregnancy (fertility) in female rats is chosen as the food TRVs for deriving soil ESLs for manganese in mammals. This TRV was selected from a data pool of 1 reference Ref ID 0192), 1 experiment, and 6 reproductive effects. Percent pregnancy (Experiment Effect ID 0192_MN_1D) was selected because it was the most sensitive of the effects considered and because both a NOAEL and LOAEL are available for this effect (a total of three nominal exposure levels were administered). Furthermore, percent pregnancy is an ecologically relevant effect because it reflects potential reproductive impacts and is directly related to reproductive success/health of wildlife populations. Other effects considered were number of resorptions, preimplantation deaths, ovulation, litter size, and fetal weight.□ □ In this chronic study (up to 114 days and during a critical life stage*), manganese was administered orally through food to the pregnant Long-Evans rat. This exposure is related to the exposure route of concern for soil ESLs (food web transfer by way of consumption of cor	The toxicity reference value (TRV) is based on a no observed adverse effect level, and the exposure period covers the development stage of the animal (chronic-critical life stage). Therefore, the application of an uncertainty factor is unnecessary.	N/A
INORG	Manganese	Mammal	Rat	8.80E+01	mg/kg/d	chronic NOAEL	NO	344	diet	ORNL value	2/1/1999	(see PTV information)	(see PTV information)	(see PTV information)
INORG	Mercury (inorganic)	Invertebra	Earthworm (Octochaetus pattoni)	5.00E-02	mg/kg	chronic NOEC	YES	97	O/D	LANL derived value based on secondary data	2/1/1999	This chronic NOEC of 0.05 mg/kg for effects on survival and reproduction (cocoon production) is based on a chronic LOEC of 0.5 mg/kg. The earthworm (Octochaetus pattoni) was exposed to inorganic Hg orally/ dermally in a soil/ manure mix for 60 days. A 65% reduction in survival and a 40% reduction in cocoon production were observed at 0.5 mg/kg compared to control. This experiment was the only one available. The value used to derive the TRV was the only one available.	LOEC to NOEC UF = 0.1	Chronic NOEC = 0.1(Chronic LOEC)
INORG	Mercury (inorganic)	Invertebra	Earthworm	1.00E-01	mg/kg	ORNL benchmark	NO	96	soil	ORNL value	2/1/1999	Based on an LOEC of 0.5 ppm from the work of Abbasi and Soni, 1983 with a safety factor of 5 applied because 0.5 ppm caused a 65% reduction in survival	Low confidence in the benchmark because the value is based on a limited amount of data	Benchmark = (0.2)LC50 = 0.2(0.5 mg/kg)
INORG	Mercury (inorganic)	Invertebra	Earthworm (Eisenia fetida)	2.50E+00	mg/kg	chronic NOAEL	NO	716	soil	EPA Region VI Screening value	6/30/1999	chronic NOAEL is based upon a toxicity value for methyl mercury.	No UF applied.	None.
INORG	Mercury (methyl)	Bird	Duck, Mallard	6.40E-03	mg/kg/d	chronic NOAEL	YES	344	OD	LANL value based on secondary data	2/1/1999	(see PTV information)	LOAEL to NOAEL UF = 0.1	Chronic NOAEL = 0.1(Chronic LOAEL)
INORG	Mercury (methyl)	Bird	Duck, Mallard	6.40E-03	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (3 generation) LOAEL for mortality.	UF of 10 applied.	Chronic NOAEL = Chronic LOAEL/ UF = 0.064 mg/kg bw/d / 10 = 0.0064 mg/kg bw/d
INORG	Selenium	Plant	Sorgrass	1.00E-01	mg/kg	chronic NOEC	YES	95	USOIL-SC	LANL derived value based on secondary data	9/28/2001	This chronic NOEC of 0.1 mg/kg for effects on development (growth from seed measured as shoot weight) is based on a LOEC of 1 mg/kg. Sorgrass were exposed to the chemical from seed for 42 days by uptake (direct absorption through the seed coat followed by root uptake) from soil (loamy sand). Se was added to the soil as sodium selenate. A 59% reduction in shoot weight was observed at 1 mg/kg. This experiment was selected from a data pool of 14 experiments (9 NOECs with accompanying LOECs and 5 LOECs). The chronic NOECs with accompanying LOECs that were not selected were for effects on sorgrass development in sand (NOEC = 1 and LOEC = 2 mg/kg); alfalfa development in clay loam with % organic matter of 15% and pH of 6 or % organic matter of 13% and pH of 7 or in a sandy loam (All with NOEC = 0.5 and LOEC = 1.5 mg/kg); and alfalfa development in silty clay loam with pH 8 and % organic matter of 3.1, 3.7 or 5 or with pH 7 and % organic matter of 6.5 (All with NOEC = 1 and LOEC = 2 mg/kg) or with pH 7 and % organic matter of 6.3 (NOEC = 2 and LOEC = 4 mg/kg). The chronic LOECs not selected were for e	LOEC to NOEC UF = 0.1	Chronic NOEC = 0.1(Chronic LOEC)
INORG	Selenium	Plant	Alfalfa	5.00E-02	mg/kg	chronic NOAEL	NO	716	soil	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a subchronic NOAEL for shoot weight.	UF of 10 applied.	Chronic NOAEL = Subchronic NOAEL/ UF = 0.5 mg/kg / 10 = 0.05 mg/kg

Suite	Analyte	Receptor	Test organism	TRV	TRV units	TRV type	LANL TRV	Ref ID	Exposure Route	TRV data source	Value updated	Derivation notes	UF notes	TRV calculation
INORG	Selenium	Plant	Plant	1.00E+00	mg/kg	ORNL benchmark	NO	94	soil	ORNL value	2/1/1999	based on estimating the 10th percentile of 14 LOEC values	Low confidence in the benchmark because the 10th percentile LOEC of 14 values was the lowest concentration tested and caused severe decreases in the measured growth parameter	Calculated 10th percentile of 14 LOEC values
INORG	Selenium	Mammal	Rat	2.00E-01	mg/kg/d	chronic NOAEL	YES	344	OW	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 0.2 mg/kg/d for reproductive effects is based on a drinking water concentration of 1.5 ppm and has an accompanying chronic LOAEL of 0.33 mg/kg/d based on a drinking water concentration of 2.5 ppm. Rats were exposed to the chemical in their drinking water for one year through two generations including during a critical life stage (reproduction) at three dose levels (1.5, 2.5 and 7.5 ppm). A reduction of the number of second-generation young in females was observed in the 2.5 ppm group, a reduction of fertility, juvenile growth, and survival was observed in the 7.5 ppm group, and no adverse effects were observed in the 1.5 ppm group. Both body weight and water consumption rate used to calculate these effect levels were taken from a data source other than the mentioned study.	No UFs applied.	None
INORG	Selenium	Mammal	Mouse	1.00E-03	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (>150 day) LOAEL for mortality.	UF of 10 applied.	Chronic NOAEL = Chronic LOAEL/ UF = 0.01 mg/kg bw/d / 10 = 0.001 mg/kg bw/d
INORG	Selenium	Mammal	Rat	2.00E-01	mg/kg/d	chronic NOAEL	YES	344	OW	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 0.2 mg/kg/d for reproductive effects is based on a drinking water concentration of 1.5 ppm and has an accompanying chronic LOAEL of 0.33 mg/kg/d based on a drinking water concentration of 2.5 ppm. Rats were exposed to the chemical in their drinking water for one year through two generations including during a critical life stage (reproduction) at three dose levels (1.5, 2.5 and 7.5 ppm). A reduction of the number of second-generation young in females was observed in the 2.5 ppm group, a reduction of fertility, juvenile growth, and survival was observed in the 7.5 ppm group, and no adverse effects were observed in the 1.5 ppm group. Both body weight and water consumption rate used to calculate these effect levels were taken from a data source other than the mentioned study.	No UFs applied.	None
INORG	Selenium	Mammal	Mouse	1.00E-03	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (>150 day) LOAEL for mortality.	UF of 10 applied.	Chronic NOAEL = Chronic LOAEL/ UF = 0.01 mg/kg bw/d / 10 = 0.001 mg/kg bw/d
INORG	Silver	Plant	Barley	5.00E-02	mg/kg	Chronic NOEC	YES	903	USOIL	LANL derived value based on reviewed primary data	9/30/2000	Only a chronic LOEC of 0.5 mg/kg was obtained from four exposure concentrations administered. It was the only value available for consideration. The PTV chosen for the derivation of the toxicity reference value (TRV) is from Ref ID 0641 and is based upon critical levels in solution at which effects on yield of barley were observed (Experiment Effect ID 0641_AG_1A). The resulting TRV is considered protective of plant populations because it is a level at which yield is expected to be adversely affected, and lower numbers of individuals reaching optimal reproductivity and a decrease in population size may result. □ □ In this chronic study (seedling to five-leaf stage, at least 2 weeks), silver was administered in an aqueous solution to a sand soil and the impacts on yield of barley seedlings by way of root uptake were assessed. This test exposure route is related to the exposure route of concern for soil ESLs because both involve uptake by way of roots. The solution was applied to the soil every other day, therefore the true concentration the barley was exposed to may be lower (i.e., more conservative) than the stated critical value of 0.5 ppm silver. Th	Only a chronic LOEC was obtained from the reference reviewed. Therefore, an uncertainty factor of 0.1X was applied to achieve an adequately protective, no-effects based TRV. It is assumed that 1 ml of the nutrient solution weighs 1 gram so that the aqueous concentration is equivalent to the concentration in soil.	Chronic NOEC = 0.1(Chronic LOEC)

Suite	Analyte	Receptor	Test organism	TRV	TRV units	TRV type	LANL TRV	Ref ID	Exposure Route	TRV data source	Value updated	Derivation notes	UF notes	TRV calculation
INORG	Silver	Plant	Plant	2.00E-02	mg/kg	chronic NOAEL	NO	716	soil	EPA Region VI Screening value	6/30/1999	chronic NOAEL is based upon a generic secondary data source toxicity value.	UF of 100 applied.	Chronic NOAEL = generic toxicity value/ 100 = 2 mg/kg / 100 = 0.02 mg/kg
INORG	Silver	Plant	Plant	2.00E-01	mg/kg	LANL NOEC	NO	95	soil	LANL derived value based on secondary data	2/1/1999	LOEC is based on phytotoxicity and was selected because it was the only value available.	LOEC to NOEC Uncertainty Factor = 10. LOEC not based on a growth or yield effect, was the only study evaluated, and value was from a secondary data source.	NOEC = LOEC/ 10 where LOEC = 2 mg/kg
INORG	Silver	Plant	Plant	2.00E+00	mg/kg	ORNL benchmark	NO	94	soil	ORNL value	2/1/1999	based on a LOEC of 2 ppm from the work of Kabata-Pendias and Pendias, 1984	Low confidence in the benchmark because it is based on a value from a secondary data source and the toxic effects were not reported	N/A
INORG	Silver	Mammal	Mouse, NMRI strain	2.00E-02	mg/kg/d	Chronic NOAEL	YES	858	OW	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOAEL of 0.02 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 2 references and 3 effects. Effects included ratio of left ventricle weight of the heart to the final body weight of the rat, hypoactivity, and body weight. The PTV chosen for the derivation of the TRV is from Ref ID 0664 and is based on female body weight effects (Experiment Effect ID 0664_AG_2A) resulting from a chronic, oral exposure through water. Other body weight effects were eliminated because they were based on daily intraperitoneal injections for two days. Hypoactivity was eliminated because it reflected an acute exposure through injections and also because it is not as clearly related to long-term effects on population. The TRV based on body weight effects is protective of wildlife populations because growth may affect behavior, physiology, and therefore, reduce success in competing for mates, breeding, and producing viable offspring.□ □ In this chronic (125 days) study, 0.015% silver nitrate (0.06 mg silver/day) was administered orally through drinking water to female 60-day-old mice (NMRI strain). This test exposure ro	Because this exposure was chronic and the TRV is based on a no observed adverse effects level, the application of an Uncertainty Factor is unnecessary.	N/A
INORG	Silver	Mammal	Mouse	3.75E-01	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (125 day) LOAEL for hypoactivity.	UF of 10 applied.	Chronic NOAEL = Chronic LOAEL/ UF = 3.75 mg/kg bw/d / 10 = 0.375 mg/kg bw/d
INORG	Silver	Mammal	Rat	1.78E+01	mg/kg/d	chronic NOAEL	NO	92	diet	LANL value based on secondary data	2/1/1999	(see PTV information)	(see PTV information)	(see PTV information)
INORG	Thallium	Plant	Ryegrass	1.00E-01	mg/kg	Chronic NOEC	YES	903	USOLN	LANL derived value based on reviewed primary data	9/30/2000	The chronic NOEC of 0.1 mg/kg and an accompanying LOEC of 0.5 mg/kg were derived from primary toxicity values (PTVs) selected from a data pool of 4 references and 18 effects. Effects included growth (seedling radicle elongation, root/shoot weight, root/shoot length), production (yield, net photosynthesis), and reproduction (germination percent). The PTV chosen for the derivation of the toxicity reference value (TRV) is from Ref ID 0619 and is based on root/shoot length and weight (Experiment Effect IDs 0619_TL_1A and 0619_TL_1B, respectively). The resulting TRV is considered protective of plant populations because chemical effects during the growth/development stage may render individual plants less viable to reproduce and sustain populations. The PTV is based on one of ten nominal exposure concentrations ranging from 0.0001 to 2.5 mg/L.□ □ In this chronic (3 weeks) study, 10- to 14-day-old ryegrass seedlings were placed in glass vessels containing an aqueous thallium nitrate solution. This test exposure route is related to the exposure route of concern for soil ESLs because both involve uptake through the roots	Because a chronic no observed effects concentration was obtained from the studies reviewed, the application of an uncertainty factor is unnecessary.	N/A
INORG	Thallium	Plant	Plant	1.00E-02	mg/kg	chronic NOAEL	NO	716	soil	EPA Region VI Screening value	6/30/1999	chronic NOAEL is based upon a generic secondary data source toxicity value.	UF of 100 applied.	Chronic NOAEL = generic toxicity value/ 100 = 1 mg/kg / 100 = 0.01 mg/kg

Suite	Analyte	Receptor	Test organism	TRV	TRV units	TRV type	LANL TRV	Ref ID	Exposure Route	TRV data source	Value updated	Derivation notes	UF notes	TRV calculation
INORG	Thallium	Plant	Plant	1.00E-01	mg/kg	LANL NOEC	NO	95	soil	LANL derived value based on secondary data	2/1/1999	LOEC based on phytotoxicity and selected because	LOEC to NOEC UF = 10, only study, not a growth or yield effect, and value from secondary data source.	NOEC = LOEC/ 10 where LOEC = 1 mg/kg
INORG	Thallium	Plant	Plant	1.00E+00	mg/kg	ORNL benchmark	NO	94	soil	ORNL value	2/1/1999	based on a LOEC of 1 ppm from the work of Kabata-Pendias and Pendias, 1984	Low confidence in the benchmark because it is based on a value from a secondary data source and the toxic effects were not reported	N/A
INORG	Thallium	Mammal	Rat, Wistar	7.10E-02	mg/kg/d	Chronic NOAEL	YES	858	OW	LANL derived value based on reviewed primary data	4/25/2000	The chronic LOAEL of 0.71 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 1 reference, 1 experiment, and 4 effects. Effects considered in the selection included histological changes in testes, male reproductive system parameters (e.g., relative testicular weight, seminiferous tubular diameter), testicular enzyme activities, and sperm motility. The PTV chosen for the derivation of the toxicity reference value (TRV) is from Ref ID 0027 and is based on sperm motility (Experiment Effect ID 0027_TL_1A). The other effects were eliminated from the PTV selection process because they were associated with a less clear link to long-term population health. The resulting TRV for reproduction is considered protective of wildlife populations because a decrease in sperm motility may lead to reduced success of fertilization in the female species and therefore less offspring produced. Only one nominal exposure level was administered.□ □ In this chronic (60 days during a critical life stage*) study, thallium (+1) sulfate was administered orally in drinking water to adult, male Wistar rats. This test exposure route is re	Although the exposure duration of the study is subchronic, it occurred during a critical life stage (reproduction) and is considered chronic. However, an uncertainty factor of 0.1 was applied to obtain the chronic NOAEL because only a chronic LOAEL was reported.	Chronic NOAEL = 0.1(Chronic LOAEL)
INORG	Thallium	Mammal	Rat	7.40E-03	mg/kg/d	chronic NOAEL	NO	344	diet	LANL value based on secondary data	2/1/1999	(see PTV information)	(see PTV information)	(see PTV information)
INORG	Thallium	Mammal	Rat	1.31E-02	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a subchronic (60 day) LOAEL for testicular function.	UF of 100 applied.	Chronic NOAEL = Subchronic LOAEL/ UF = 1.31 mg/kg bw/d / 100 = 0.0131 mg/kg bw/d
INORG	Titanium	Mammal	Rat	1.58E+01	mg/kg/d	chronic NOAEL	YES	92	O	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 15.8 mg/kg/d is for effects associated with reproduction, development or mortality and is based on a chronic LOAEL of 158 mg/kg/d. Rats were exposed to the chemical orally and daily. The study spanned at least 26 weeks. No further study details were reported.	LOAEL to NOAEL UF = 0.1	Chronic NOAEL = 0.1(Chronic LOAEL)
INORG	Uranium	Bird	Duck, American Black	7.80E+00	mg/kg/d	Chronic NOAEL	YES	715	OD	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOAEL of 7.8 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 1 reference, 1 experiment, and 2 effects. Both effects, body weight and mortality (Experiment Effect IDs 0207_U_1A and 0207_U_1B, respectively), had the same value. The resulting toxicity reference value (TRV) is considered protective of wildlife populations because either there is a decrease in the number of individuals needed to sustain a population or impacts on growth render potentially healthy reproductive individuals incapable of contributing to the success of the population. The exposure level used in TRV derivation was the highest (1600 ppm) of four nominal exposure concentrations administered.□ □ In this chronic (6 weeks during a critical life stage) study, powdered uranium was added to the diet and administered to adult male and female American black ducks. This test exposure route is related to the exposure route of concern for soil ESLs (food web transfer through the consumption of plants and/or animals) because both are oral through the diet. Body weights and food ingestion rates were not provided in this source. Instead, body weigh	Although the exposure duration of the study is subchronic, it occurred during a critical life stage (reproduction) and is considered chronic. However, an uncertainty factor of 0.1 was applied to obtain the chronic NOAEL because only a chronic LOAEL was reported.	Chronic NOAEL = 0.1(Chronic LOAEL)

Suite	Analyte	Receptor	Test organism	TRV	TRV units	TRV type	LANL TRV?	Ref ID	Exposure Route	TRV data source	Date updated	Derivation notes	UF notes	TRV calculation
INORG	Uranium	Bird	Duck, Black	1.60E+01	mg/kg/d	chronic NOAEL	NO	344	diet	ORNL value	2/1/1999	(see PTV information)	(see PTV information)	(see PTV information)
INORG	Uranium	Plant	Chard, Swiss	2.50E+01	mg/kg	Chronic NOEC	YES	715	USOIL	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOEC of 25 mg/kg soil (dry weight) for growth (root weight) in the Swiss chard is selected as the soil TRV for deriving the soil ESL for uranium in plants. The effect level was selected from a pool of one measured effect (root weight) measured in two different soils (peat and sand). Soils in the Los Alamos area are generally sandy in nature and therefore are better represented by the results of the exposure of Swiss chard in sand. Therefore, the primary toxicity value chosen from Ref ID 0251 for the derivation of the TRV is based on root weight in sand (Experiment Effect ID 0251_U_2A).□ □ In this chronic (40 days) duration study, uranyl nitrate was applied to soil along with a nutrient solution to determine effects on growth of mature plants. This test exposure route is similar to the exposure route of concern for soil ESLs because both involve uptake by way of roots. The NOEC is based on the highest of four nominal exposure concentrations administered	Because the exposure is chronic and based on a no observed effects concentration, the application of an uncertainty factor is unnecessary.	N/A
INORG	Uranium	Plant	Plant	5.00E+00	mg/kg	ORNL benchmark	NO	94	soil	ORNL value	2/1/1999	based on a LOEC of 5 ppm (lowest concentration tested) from the work of Sheppard et al., 1983	Low confidence in the benchmark because it is based on one study	N/A
INORG	Uranium	Mammal	Mouse, Swiss	6.10E+00	mg/kg/d	Chronic NOAEL	YES	715	OG	LANL derived value based on reviewed primary data	6/30/1999	The chronic NOAEL of 6.1 mg/kg/d with an accompanying chronic LOAEL of 15.3 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 1 reference, 1 experiment, and 13 reproductive effects. The PTV chosen for the derivation of the toxicity reference value (TRV) is from Ref ID 0205 and is based on number of dead fetuses, late resorptions, live fetuses, and total resorptions (Experiment Effect IDs 0205_U_1A, 0205_U_1C, 0205_U_1D, and 0205_U_1G, respectively). Other reproductive effects included number of total implants, pregnant mice, and early resorptions. The chronic NOAEL TRV is considered protective of wildlife populations because reproductive effects are a better measure of long-term effects; if individual reproductive performance is hindered, the capability to help sustain the population is affected. The exposure levels used for the chronic NOAEL and LOAEL are derived from the two highest of three nominal exposure concentrations administered, respectively.□ □ In this chronic (60 days for males and 14 days for females before breeding, and during breeding") study, uranium was administered orally by gavage to adult Swiss mice. This test	Although the exposure duration is subchronic based on number of days exposed, it is considered chronic because it is during a critical life stage (reproduction). The TRV is also based on a no observed adverse effect level. The application of an uncertainty factor is unnecessary.	N/A
INORG	Uranium	Mammal	Mouse	3.07E+00	mg/kg/d	chronic NOAEL	NO	344	diet	ORNL value	2/1/1999	(see PTV information)	(see PTV information)	(see PTV information)
INORG	Zinc	Plant	Soybean	1.00E+01	mg/kg	chronic NOEC	YES	95	USOIL-SC	LANL derived value based on secondary data	2/1/1999	This chronic NOEC of 10 mg/kg for effects on reproduction (seeds/ plant) has an accompanying LOEC of 25 mg/kg. Soybeans were exposed to Zn from seed to maturity by uptake (direct absorption through seed coat followed by root uptake) from soil (surface soil). A 28% reduction in the number of seeds/ plant was observed at 25 mg/kg, while 10 mg/kg had no effect. Also, nodule weight and number and seed weight were not affected by 10 mg/kg. This experiment was selected from a data pool of 14 available experiments (8 chronic NOECs with accompanying LOECs and 6 chronic LOECs). Of the NOEC/ LOEC pairs that were not selected, 6 pairs were not usable because they did not represent total Zn concentrations, but rather "exchangeable" Zn. The other NOEC/ LOEC pair not selected was for effects on soybean growth in sandy loam (NOEC = 115 and LOEC = 131 mg/kg). Of the LOECs not selected, one was not usable because it did not represent a total Zn concentration, but rather 1M ammonium acetate-extractable Zn. The other LOECs not selected were for effects on spinach and coriander development in surface soil (Both LOECs	No UFs applied.	None
INORG	Zinc	Plant	Barley (spring)	9.00E-01	mg/kg	chronic NOAEL	NO	716	soil	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic LOAEL.	UF of 10 applied.	Chronic NOAEL = Chronic LOAEL/ UF = 9 mg/kg / 10 = 0.9 mg/kg
INORG	Zinc	Plant	Plant	5.00E+01	mg/kg	ORNL benchmark	NO	94	soil	ORNL value	2/1/1999	a LOEC of 50 ppm from 6 studies	Moderate confidence in the benchmark	N/A

Suite	Analyte	Receptor	Test organism	TRV	TRV units	TRV type	LANL TRV	Ref ID	Exposure Route	TRV data source	Value updated	Derivation notes	UF notes	TRV calculation
INORG	Zinc	Bird	Chicken, Single Comb White Leghorn	1.20E+02	mg/kg/d	Chronic NOAEL	YES	903	OD	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOAEL of 120 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 4 references and 10 effects. Effects included growth, survival, egg production, fertility and hatchability, offspring body weight, paralysis, and organ weight. The PTV chosen for the derivation of the toxicity reference value (TRV) is from Ref ID 0662 and is based on chicken egg production, fertility and hatchability and offspring body weight (Experiment Effect IDs 0662_ZN_2A, 0662_ZN_2D, and 0662_ZN_2F, respectively). The NOAEL is derived from the highest of three nominal exposure concentrations (dry weight). □ □ In this chronic (44 weeks) study, zinc sulfate was administered orally through the diet to 24-week-old single comb, white leghorn chickens (females). This test exposure route is related to the exposure route of concern for soil ESLs (food web transfer through consumption of contaminated plants and/or animals) because they are both oral through the diet. Other studies were eliminated from the PTV selection because they contained less sensitive	Because the exposure was chronic and based on a no observed adverse effects level, the application of an uncertainty factor is unnecessary.	N/A
INORG	Zinc	Bird	Chicken, White Leghorn	1.45E+01	mg/kg/d	chronic NOAEL	NO	344	diet	LANL value based on secondary data	2/1/1999	(see PTV information)	(see PTV information)	(see PTV information)
INORG	Zinc	Bird	Leghorn hen and New Hampshire rooster	1.31E+02	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a chronic (44 week) NOAEL.	No UF applied.	None.
INORG	Zinc	Mammal	Rat	1.60E+02	mg/kg/d	chronic NOAEL	YES	344	OD	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 160 mg/kg/d for reproductive effects is based on a dietary concentration of 2000 ppm and has an accompanying chronic LOAEL of 320 mg/kg/d based on a dietary concentration of 4000 ppm. Rats were exposed to the chemical in their diet during days 1 through 16 of gestation, a critical life stage (reproduction), at two dose levels (2000 and 4000 ppm). An increase in rates of fetal resorption and a reduction of fetal growth rate were observed in the 4000 ppm group and no adverse effects were observed in the 2000 ppm group. Both the body weight and food consumption rate used to calculate these effect levels was taken from a data source other than the mentioned study.	No UFs applied.	None
INORG	Zinc	Mammal	Mouse	1.04E+01	mg/kg/d	chronic NOAEL	NO	716	diet	EPA Region VI Screening value	6/30/1999	The chronic NOAEL is based upon a subchronic (13 week) NOAEL.	UF of 10 applied.	Chronic NOAEL = Subchronic NOAEL/ UF = 104 mg/kg bw/d / 10 = 10.4 mg/kg bw/d
PAH	Acenaphthene	Plant	Lettuce	2.50E-01	mg/kg	chronic NOEC	YES	95	USOIL-SC	LANL derived value based on secondary data	9/28/2001	This chronic NOEC of 0.25 mg/kg for effects on development (growth from seed measured as fresh shoot weight) is based on a chronic EC50 of 25 mg/kg. Lettuce were exposed to the chemical from seed for 14 days by uptake (direct absorption through seed coat followed by root uptake) from soil (loam, 24% clay). This experiment was the only one available. The value used to derive the TRV is the only available value, but it does represent an ecologically relevant effect.	Chronic, Subchronic or Acute EC50 to Chronic NOEC UF = 0.01	Chronic NOAEL = 0.01(Chronic, Subchronic, or Acute EC50)
PAH	Acenaphthene	Plant	Plant	2.00E+01	mg/kg	ORNL benchmark	NO	94	soil	ORNL value	2/1/1999	based on a LOEC of 25 ppm from the work of Hulzebos et al., 1993	Low confidence in the benchmark because it is based on one study	N/A
PAH	Chrysene	Mammal	Mouse	1.70E-01	mg/kg/d	chronic NOAEL	YES	575	O	LANL derived value based on secondary data	9/28/2001	This chronic NOAEL of 0.17 mg/kg/d for tumor growth is based on a single dose NOAEL of 17 mg/kg/d. Mice were exposed orally to a single dose of the chemical. No further study details were reported.	Single Dose to Chronic UF = 0.01	Chronic NOAEL = 0.1(Single Dose NOAEL)
PAH	Naphthalene	Bird	Quail, Bobwhite	1.39E-01	mg/kg/d	chronic NOAEL	YES	428	OD	LANL derived value based on secondary data	2/1/1999	This chronic NOAEL of 0.139 mg/kg/d for growth effects is based on an acute NOAEL of 13.9 mg/kg/d, which is based on a dietary concentration of 347 mg/kg. 13-day-old bobwhite quail were exposed to the chemical in their diet. No decrease in body weight gain was observed. No further study details were reported.	Acute to Chronic UF = 0.01	Chronic NOAEL = 0.01(Acute NOAEL)
PCB	Aroclor-1254	Bird	Chicken, White Leghorn	1.00E-01	mg/kg/d	Chronic NOAEL	YES	1105	OD	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOAEL of 0.1 with an accompanying chronic LOAEL of 1 was derived from a primary toxicity value (PTV) selected from a data pool of 3 references and 8 effects (4 reproduction/development, 2 survival, and 1 growth). Effects considered in the selection included adult and chick mortality, adult and chick body weight, egg production, and hatchability. The PTV chosen for the derivation of the toxicity reference value (TRV) is from Ref ID 0756 and is based on hatchability (Experiment Effect ID (0756_11097-69-1_1A). Mortality in Ref ID 0707 was eliminated from consideration because it was from a study in which only high-dose, relatively short-term (5 day) exposures were evaluated. The other study (Ref ID 0758) reported adverse results (LOAEL) at 2.63 mg/kg/d, and with conversion to NOAEL, this would produce a value of 0.263 mg/kg/d which is close to the value selected for the TRV. The 0.1 mg/kg/d TRV is considered protective of wildlife populations because hatchability is an indicator of the ability of the species to successfully reproduce. Poor reproduction leads to lower success of breeding and less individuals to mair	Because the exposure was chronic during a critical life stage and the TRV is based on a no observed adverse effects level, the application of an Uncertainty Factor is unnecessary.	N/A

Suite	Analyte	Receptor	Test organism	TRV	TRV units	TRV type	LANL TRV	Ref ID	Exposure Route	TRV data source	Value updated	Derivation notes	UF notes	TRV calculation
PCB	Aroclor-1254	Bird	Pheasant, Ring-necked	1.80E-01	mg/kg/d	chronic NOAEL	NO	344	OC	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 0.18 mg/kg/d for reproductive effects is based on a chronic LOAEL of 1.8 mg/kg/d (12.5 mg/bird/week converted to mg/kg/d by multiplying by 1week/ 7 days and divided by body weight). Ring-necked pheasants were exposed to the chemical by oral gelatin capsules given once a week for 17 weeks including during a critical life stage (reproduction) at two dose levels (12.5 and 50 mg/bird/week). A significant reduction in egg hatchability was observed in both groups. The body weight used to calculate the effect level was taken from a data source other than the mentioned study.	LOAEL to NOAEL UF = 0.1	Chronic NOAEL = 0.1(Chronic LOAEL)
PCB	Aroclor-1260	Bird	Quail, Bobwhite	1.07E+00	mg/kg/d	Chronic NOAEL	YES	1105	OD	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOAEL of 1.07 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 2 references with survival effects for 4 species. The PTV chosen for the derivation of the toxicity reference value (TRV) is from Ref ID 0767 and is based on survival of bobwhite quail chicks (Experiment Effect ID 0767_ 11096-82-5_1A). Although a NOAEL was available for Japanese quail in Ref ID 0707, it was eliminated in favor of the 8-day LC50s produced by Ref ID 0767 because 50% of the population did not survive at levels below the NOAEL. Therefore, the lowest LC50 (107 mg/kg/d) applied was chosen because it offers more protection for wildlife populations. Multiple exposure concentrations were administered but not specified. □ □ Although the actual exposure duration was 5 days with an additional 3 days of observation, this study was considered chronic because exposure occurred during a critical life stage (juvenile development). Aroclor 1260 was administered orally through food to 2-3 week old bobwhite quail. This test exposure route is related to the exposure route of concern for soil E	The exposure was based on a LC50, therefore a LC50 to NOAEL Uncertainty Factor of 0.01 was applied to achieve the chronic NOAEL.	Chronic NOAEL = 0.01(LC50)
PCB	Aroclor-1260	Bird	Quail, Bobwhite	4.70E-03	mg/kg/d	chronic NOAEL	NO	428	OD	LANL derived value based on secondary data	9/28/2001	This chronic NOAEL of 0.0047 mg/kg/d for mortality is based on a LC50 of 117 mg/kg, which is equal to a dose rate of 0.468 mg/kg/d. Bobwhite quail chicks were exposed to the chemical orally in their diet. No further study details were reported.	Acute LC50 to Chronic NOAEL UF = 0.01	Chronic NOAEL = 0.01(Acute LC50)
PCB	Aroclor-1260	Mammal	Rat, Sherman	6.90E+00	mg/kg/d	Chronic NOAEL	YES	1105	OD	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOAEL of 6.9 mg/kg/d with an accompanying chronic LOAEL of 35.4 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 1 reference, 4 experiments, and 8 effects. Effects considered in the selection included reproduction (litter size, offspring survival, mortality of weanlings) and growth (body weight of adult rats). The PTV chosen for the derivation of the toxicity reference value (TRV) is from Ref ID 0686 and is based on reproduction (litter size and offspring survival; Experiment Effect IDs 0686_11096-82-5_3A and 0686_11096-82-5_3B, respectively) in rats exposed to Aroclor 1260 through one generation. Authors of this study calculated both a NOAEL and LOAEL for this measurement. Although litter size and offspring survival were measured in rats exposed for two generations, only a NOAEL was available and it was the highest of three nominal exposure concentrations. Therefore, this study was not considered as useful as the one chosen where both the NOAEL and LOAEL were defined. In both studies, the NOAEL values reported are similar. Litter size and offspring measurements in another experiment w	Because the exposure was chronic during a critical life stage and the TRV is based on a no observed adverse effects level, the application of an Uncertainty Factor is unnecessary.	N/A
PCB	Aroclor-1260	Mammal	Rat	4.00E-02	mg/kg/d	chronic NOAEL	NO	92	O	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 0.04 mg/kg/d is for effects associated with reproduction, growth or survival and it was estimated by multiplying the LD50* for Aroclor 1260 by the ratio of the NOAEL** to the LD50* for a closely related compound, Aroclor-1254. This estimation method is based on information in Ref ID 0344 as cited in Ref ID 0092. (*The LD50 studies were for the rat and assumed to be oral and lasted for less than 1 week. No other study details were reported. **The NOAEL for Aroclor 1254 is based on an oral, chronic LOAEL for effects associated with reproduction or growth for the oldfield mouse. This study spanned 3 generations. No other study details were reported. The chronic LOAEL for the oldfield mouse was extrapolated to a NOAEL with a LOAEL-NOAEL UF = 0.1 and then scaled to a chronic NOAEL for a rat using the equation NOAELrat = NOAELmouse x (BWmouse/BWrat)^0.25 as described in Ref IDs 0155 and 0344 as cited in Ref ID 0092.)	Not based entirely on toxicity data for Aroclor-1260.	Chronic NOAEL[Aroclor-1260] = LD50[Aroclor-1260] x {Chronic NOAEL[Aroclor-1254] /LD50[Aroclor-1254]} = 1315 x [0.0304/1010] = 0.04 mg/kg/d
PEST	DDE[4,4'-]	Bird	Finch, Bengalese	7.10E-03	mg/kg/d	Chronic NOAEL	YES	1105	OD	LANL derived value based on reviewed primary data	9/28/2001	The chronic LOAEL of 0.071 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 4 references and 26 effects (3 survival and 23 reproduction/ development). Effects considered in the selection included adult survival, mean clutch size, % fertility, egg weight, % nestlings dying, and mean young fledged per pair. The PTV chosen for the derivation of the toxicity reference value (TRV) is from Ref ID 0460, and is based on # fledged per clutch/mean clutch size, % fertility, embryonic mortality, and chick survival (Experiment Effect IDs 0460_72-55-9_1B, 0460_72-55-9_1D, 0460_72-55-9_1E, and 0460_72-55-9_1F, respectively). The other effects were eliminated from consideration because they had only one dose administered, the dose at which adverse effects were first observed was considered high and no NOAEL was available, or the actual exposure duration (not altered based on occurrence during critical life stage) was acute. The LOAEL-based TRV is considered protective of wildlife populations because fertility, chick and embryo survival, and number fledging are indicators of the ability of the species to reproduc	The exposure was based on a LOAEL, therefore a LOAEL to NOAEL Uncertainty Factor of 0.1 was applied to achieve the chronic NOAEL.	Chronic NOAEL = 0.1(Chronic LOAEL)
PEST	DDE[4,4'-]	Bird	Duck, American Black	2.24E-03	mg/kg/d	chronic NOAEL	NO	427	NR	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 0.00224 mg/kg/d for egg shell thinning is based on a study that exposed captive black ducks to the chemical. No further study details were reported.	No UFs applied.	None

Suite	Analyte	Receptor	Test organism	TRV	TRV units	TRV type	LANL TRV	Ref ID	Exposure Route	TRV data source	Value updated	Derivation notes	UF notes	TRV calculation
PEST	DDT[4,4'-]	Bird	Finch, Bengalese	7.10E-03	mg/kg/d	Chronic NOAEL	YES	1105	OD	LANL derived value based on reviewed primary data	9/28/2001	The chronic NOAEL of 0.0071 mg/kg/d was derived from a primary toxicity value (PTV) selected from a data pool of 6 references and 31 effects (6 survival and 25 reproduction/development). Effects considered in the selection included adult, chick, and embryo survival, body weight, egg production, hatchability, mean clutch size, # mean fledged/mean clutch size, and egg and eggshell weight. The PTV chosen for the derivation of the toxicity reference value (TRV) is from Ref ID 0460 and is based on % fertility, embryonic mortality, and chick survival (Experiment Effect IDs 0460_50-29-3_1D, 0460_50-29-3_1E, and 0460_50-29-3_1F, respectively). There were more exposure doses administered to the organisms in this study, and adverse effects occurred for 7 of 9 reproductive parameters at 0.071 mg/kg/d (LOAEL). Mortality effects in Ref IDs 0707 and 0767 were eliminated from consideration because it was from a study in which only high-dose, relatively short-term (5 day) exposures were evaluated. The selected NOAEL is considered protective of wildlife populations because % fertility and embryo and chick surviv	The exposure was based on a LOAEL, therefore a LOAEL to NOAEL Uncertainty Factor of 0.1 was applied to achieve the chronic NOAEL.	Chronic NOAEL = 0.1(Chronic LOAEL)
PEST	DDT[4,4'-]	Bird	Pelican, Brown	2.80E-03	mg/kg/d	chronic NOAEL	NO	344	OD	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 0.0028 mg/kg/d for reproductive effects is based on a chronic LOAEL of 0.028 mg/kg/d, which is based on a dietary concentration of 0.15 ppm. The reproductive success of brown pelicans was studied for 5 years in the wild. During this time, the DDT content of their primary food source (anchovies) declined from 4.27 to 1.5 ppm. Although the reproductive success improved over the 5 years of the experiment, the fledgling rate associated with consumption of anchovies with 1.5 ppm DDT residues was still 30% below that required to maintain a stable population. The body weight and food consumption rate used to calculate the effect level were taken from a data source other than the mentioned study.	LOAEL to NOAEL UF = 0.1	Chronic NOAEL = 0.1(Chronic LOAEL)
PEST	Endrin	Bird	Owl, Screech	1.00E-02	mg/kg/d	chronic NOAEL	YES	344	OD	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 0.01 mg/kg/d for reproductive effects is based on a chronic LOAEL of 0.1 mg/kg/d, which is based on a dietary concentration of 0.75 ppm. Screech owls were exposed to the chemical in their diet for greater than 83 days including during a critical life stage (reproduction) at one dose level (0.75 ppm). Egg production and hatching success were reduced in the 0.75 ppm group. Both the body weight and food consumption rate used to calculate the effect level were taken from a data source other than the mentioned study.	LOAEL to NOAEL UF = 0.1	Chronic NOAEL = 0.1(Chronic LOAEL)
SVOC	Bis(2-ethylhexyl)phthalate	Bird	Dove, Ringed	1.10E+00	mg/kg/d	chronic NOAEL	YES	344	OD	LANL value based on secondary data	2/1/1999	This chronic NOAEL of 1.1 mg/kg/d for reproductive effects is based on a dietary concentration of 10 ppm. Ringed doves were exposed to the chemical in their diet for 4 weeks including during a critical life stage (reproduction) at one dose level (10 ppm). No significant reproductive effects were observed with an exposure of 10 ppm. Both the body weight and food consumption rate used to calculate the effect level were taken from a data source other than the mentioned study.	No UFs applied.	None

Darlene

ORGANIC AND METAL CONTAMINANTS IN A FOOD CHAIN OF THE AMERICAN PEREGRINE FALCON (*FALCO PEREGRINUS*) AT THE LOS ALAMOS NATIONAL LABORATORY, NEW MEXICO

BY

JILL SAMARA PODOLSKY, B.S.

A Thesis submitted to the Graduate School

in partial fulfillment of the requirements

for the degree

Master of Science

Major subject: Wildlife Science

Minor subject: Toxicology

New Mexico State University

Las Cruces, New Mexico

May 2000

Table 4. Selected organochlorine and metal concentrations (mg/kg dry weight) in birds from the Los Alamos Canyon, Pueblo Canyon, Ash Pile, and Jemez Mountain sites. # indicates the number of birds composited into one sample.

		Chemical Concentration (mg/kg dry weight)						
Site Species	#	Aroclor 1260	DDE	DDT	Al	Pb	Hg	Se
Los Alamos Canyon								
American robin	1	2.06	2.58	0.33*	16*	3.04	0.0002*	3.14
Northern flicker	1	5.23	0.06	0.05	75	5.56	0.0002*	2.88
Spotted towhee WR	1	0.42	0.04	0.02*	16*	0.85	0.0003	2.65
Hermit thrush	1	5.23	0.03*	0.14	16*	0.59	0.0004	2.9
White-breasted nuthatch WR	2	3.92	0.09	0.02*	16*	0.85	0.0005	3.27
Pueblo Canyon								
Hairy woodpecker WR	1	0.08*	0.01*	0.01*	16*	1.83	0.0002*	3.07
Western bluebird WR	2	2.06	0.1	0.05	16*	1.86	0.0009	2.29
Canyon towhee WR	1	0.18	0.06	0.02*	16*	0.98	0.0002*	3.14
Ash Pile								
House sparrow 1 WR	2	0.16	0.15	0.02*	16*	2.39	0.0002*	3.20
House sparrow 2 WR	2	0.08*	0.02	0.01*	39	16	0.0002*	3.20
Chipping sparrow	4	0.52	0.21	0.04*	16*	5.56	0.0002*	3.27
Spotted towhee 1 WR	2	0.25	0.95	0.11*	39	3.59	0.0002*	2.97
Spotted towhee 2 WR	2	0.36	0.65	0.07*	16*	0.95	0.0002*	3.07
Spotted towhee 3 WR	1	0.75	0.88	0.33*	52	1.9	0.0002*	3.27
Jemez Mountains								
Western tanager	1	0.33*	0.14	0.03*	16*	0.56	0.0002*	2.81
Dark-eyed junco	2	0.16*	0.39	0.08*	105	0.72	0.0002*	2.25

* indicates samples below minimum detection limits. They are substituted with "replaced" values, or half of the detection limit.

WR = winter resident

Table A7. Peregrine falcon bird prey information.

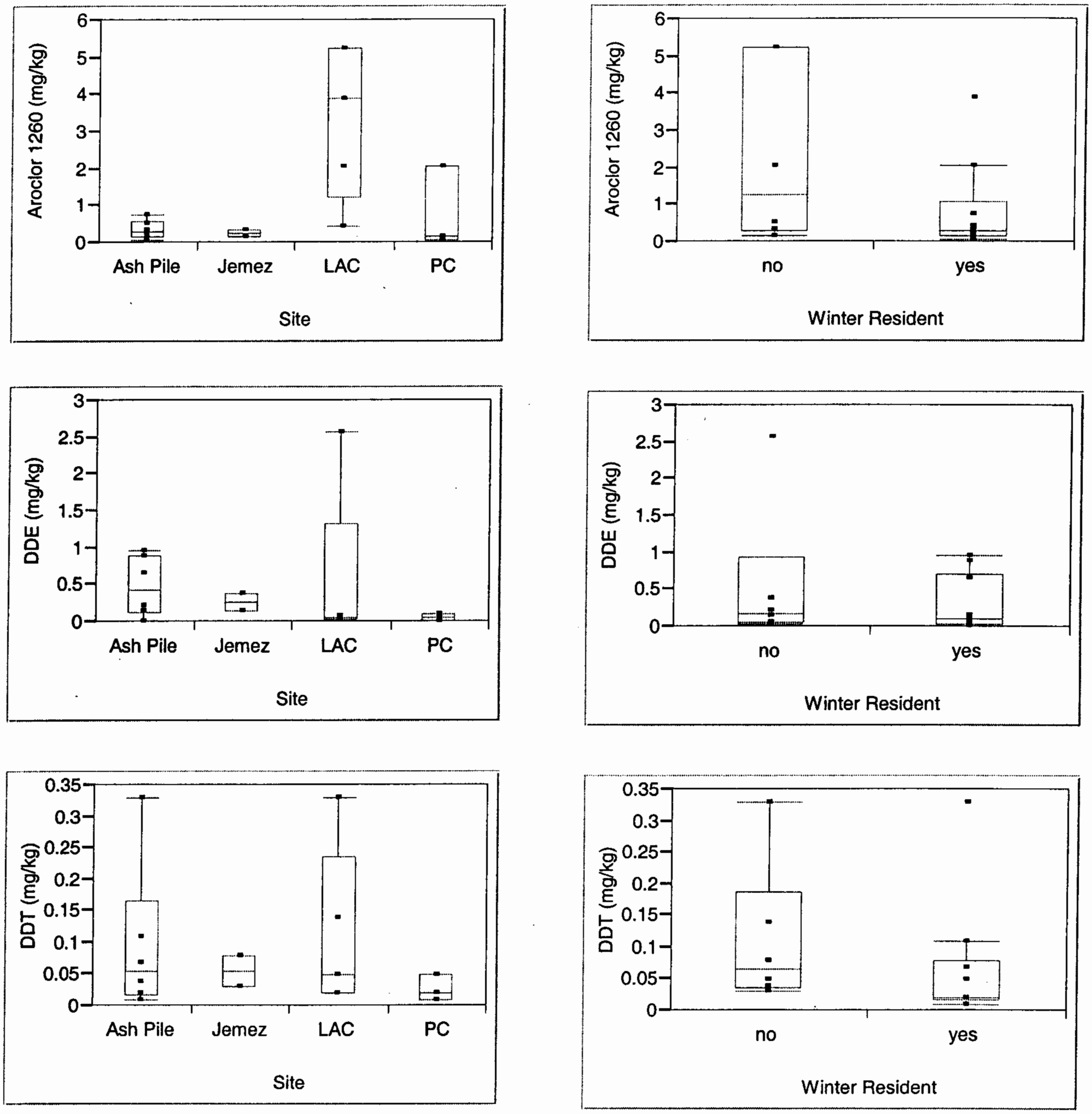
Common Name	Scientific Name	Resident?	Diet	Foraging location	prey preference
American robin	*Turdus migratorius*	Winter south to central America	insects, fruit, earthworms, snails	ground, foliage	abundant*
Northern flicker	*Colaptes auratus*	Winter within North America	insects (esp. ants), sometimes acorns, nuts, grain	ground, hawks prey, bark	abundant*
Spotted towhee	*Pipilo erythrophthalmus*	Winter resident	insects, seeds, fruits	ground, foliage	rare*
Hermit thrush	*Catharus guttatus*	Winter south to central America	insects, spiders, earthworms, salamanders, fruit	ground, foliage, hover and glean	rare*
White-breasted nuthatch	*Sitta carolinensis*	Winter resident	insects, spiders	tree bark	rare*
Hairy woodpecker	*Picoides vilosus*	Winter resident	insects, sap, (winter - acorn, hazelnuts, beechnuts)	tree bark	rare*
Canyon towhee	*Pipilo fuscus*	Winter resident	seeds, insects, fruit, young fed 100% insects	ground	rare (taken from spotted towhee data)*

Table A7 - *continued.* Peregrine falcon bird prey information.

Common Name	Scientific Name	Resident?	Diet	Foraging location	prey preference
Western bluebird	*Sialia mexicana*	Winter resident	earthworms, snails, inverts, berries, young fed insects	hawks prey, gleans foliage	common*
Chipping sparrow	*Spizella passerina*	Winter south through Mexico	insects, seeds	ground, foliage, hawks	unknown
House sparrow	*Passer domesticus*	Winter resident	seeds, insects, spiders, fruit	ground, foliage	unknown
Western tanager	*Piranga ludoviciana*	Winter from Mexico to Costa Rica	insects, fruit (few buds)	foliage, hawks	**
Dark-eyed junco	*Junco hyemalis*	Winter south to northern Mexico	seeds, insects (few spiders)	ground, hawks	rare*

Residential, diet, and foraging information was obtained from Ehrlich et al., 1988.
* Information from Peregrine Prey, Identified by NM Dept. of Game and Fish from Remains Collected in Northern New Mexico
** Identified as prey species in DeWeese et al., 1986

Bird concentrations from Table 4 (Podolsky 2000) and using resident status from Table A7 (Podolsky 2000)



Notes:

1) Beaks, legs and feathers were removed prior to analysis
2) Concentrations are on a dry weight basis

Table 1. Mean Aroclor Levels (ppm) in Various Organisms in DP and Sandia Canyons, Year 2000.

Sample Media	Sample Size (DP/Sandia)	Aroclor-1254		Aroclor-1260	
		DP	Sandia	DP	Sandia
Arthropods	3/3				
Skinks	4/3	0.08	0.04	0.21	0.65
Shrews	0/2		0.5		8.2 (10.8, 5.6)
Voles	0/3		0.004		0.2
Brush Mice	2/0	0.003		0.13	
Deer Mice	1/0	0.0003		0.01	
Owls	3/3				

Organic Biocontaminants in Food Chains at Two Canyons at the Los Alamos National Laboratory, Internal Progress Report, Biological Resources Management Plan Special Study. Los Alamos National Laboratory Controlled Publication LA-CP-01-33. April, 2000. (Authors: Gil Gonzales, Carey Bare, Kathryn Bennett, Tim Haarmann, Leslie Hansen, Charles Hathcock, David Keller, Sam Loftin, and Randy Ryti)

4/11/02

Terrestrial Receptor HQ Table Notes:

1) Avian carnivore feeding guild has HQs>>1 for only two COPECs [PCBs, DDT]
2) Mammalian carnivore feeding guild has HQs>>1 for only one COPEC [PCBs]
3) Avian invertivore feeding guild has the highest HQ values for all COPECs with HQ>1 [cobalt, cyanide, PCBs, DDT are largest contributors to "HI"]
4) Mammalian invertivore feeding guild has the highest HQ values for all COPECs with HQ>1 [barium, cobalt, silver, thallium, titanium, PCBs are largest contributors to "HI"]
5) Detritivores [invertebrates] – lowest ESL for three metals and two rads, missing ESLs for 18 of 29 initial COPECs
6) Autotrophs – lowest ESL for seven metals and two organics

Summary of HI based on Maximum Concentrations

Screening Receptor	HI of max	HR area (ha)	Impacted area for HI =1 (ha)+	Adjusted HI (ha)
Kestrel flesh	52	366	7.0	9.5 *
Kestrel	87	13.1	0.15	
Robin invertivore	444	0.42	0.0009	
Robin omnivore	247	0.42	0.002	
Robin herbivore	55	0.42	0.008	
Red fox	45	699	16	4.3 *
Vagrant shrew	746	0.39	0.0005	
Deer mouse	398	0.075	0.0002	
Desert cottontail	46	1.5	0.03	
Invertebrate	293	na	na	
Plant	700	na	na	

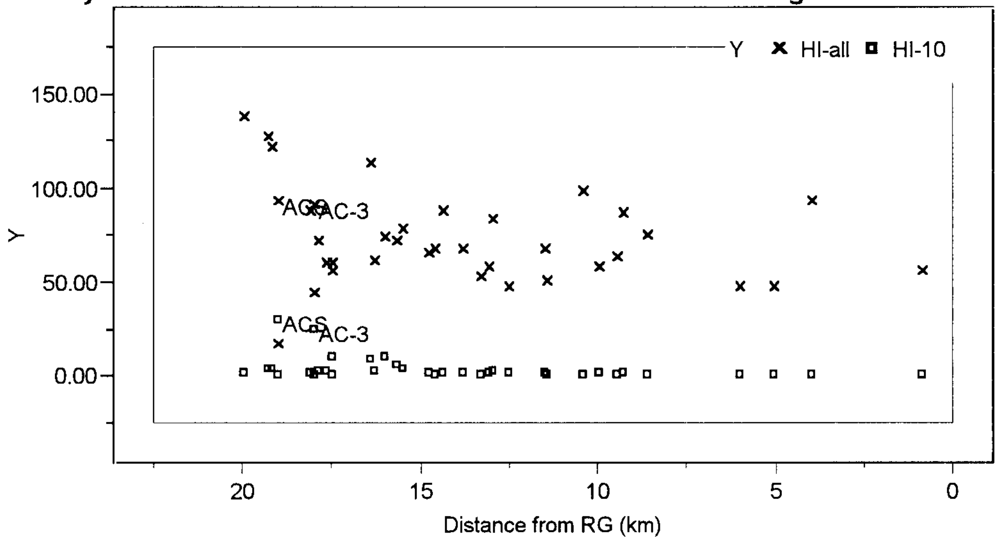
→ Need 7 ha at max value to have impac[t]

+ assumes maximum concentrations are collocated

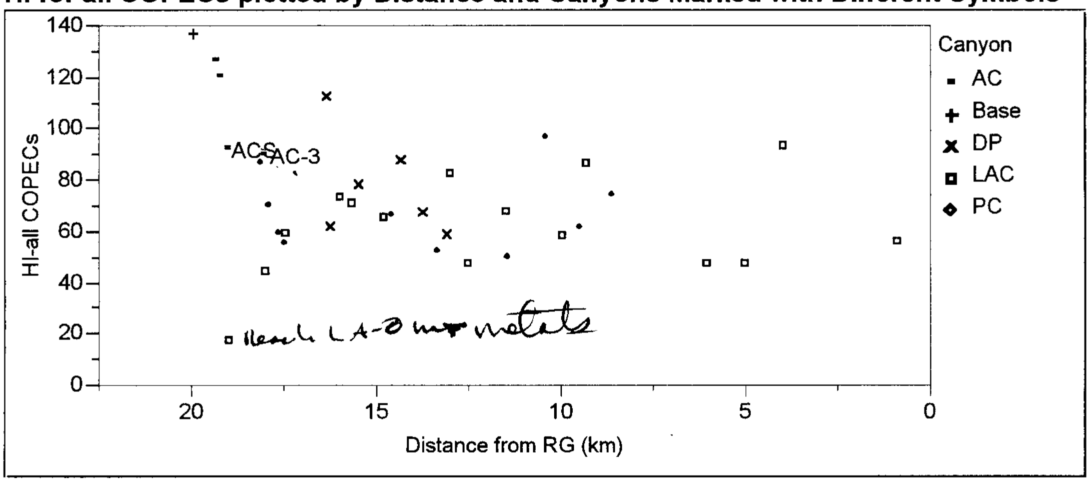
* based on total canyon area of 66 ha divided home range area, thus assumes maximum concentration for entire area covered by sediments

An indicator of what's more sensitive.

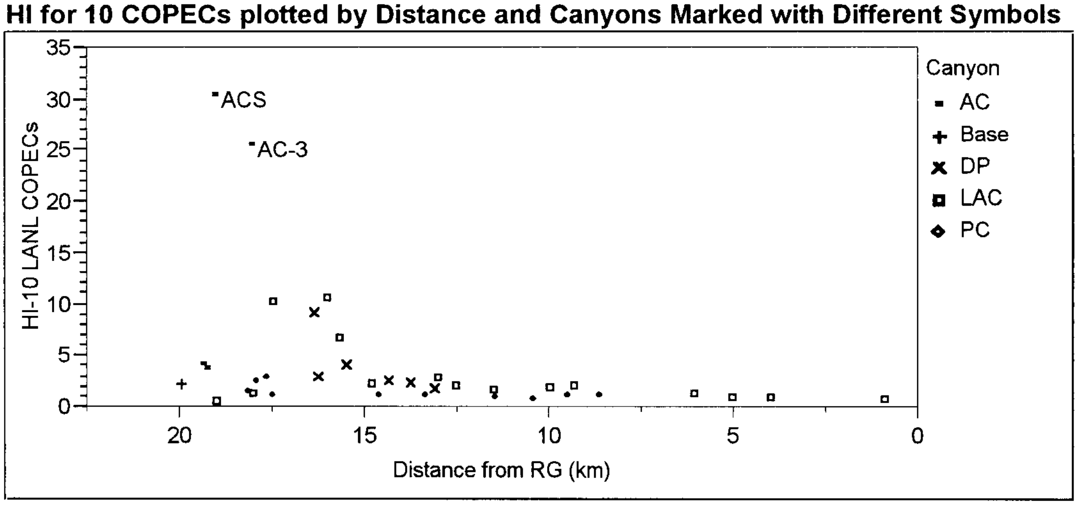
Overlay Plot of Robin-Invertivore HI based on Subreach Averages



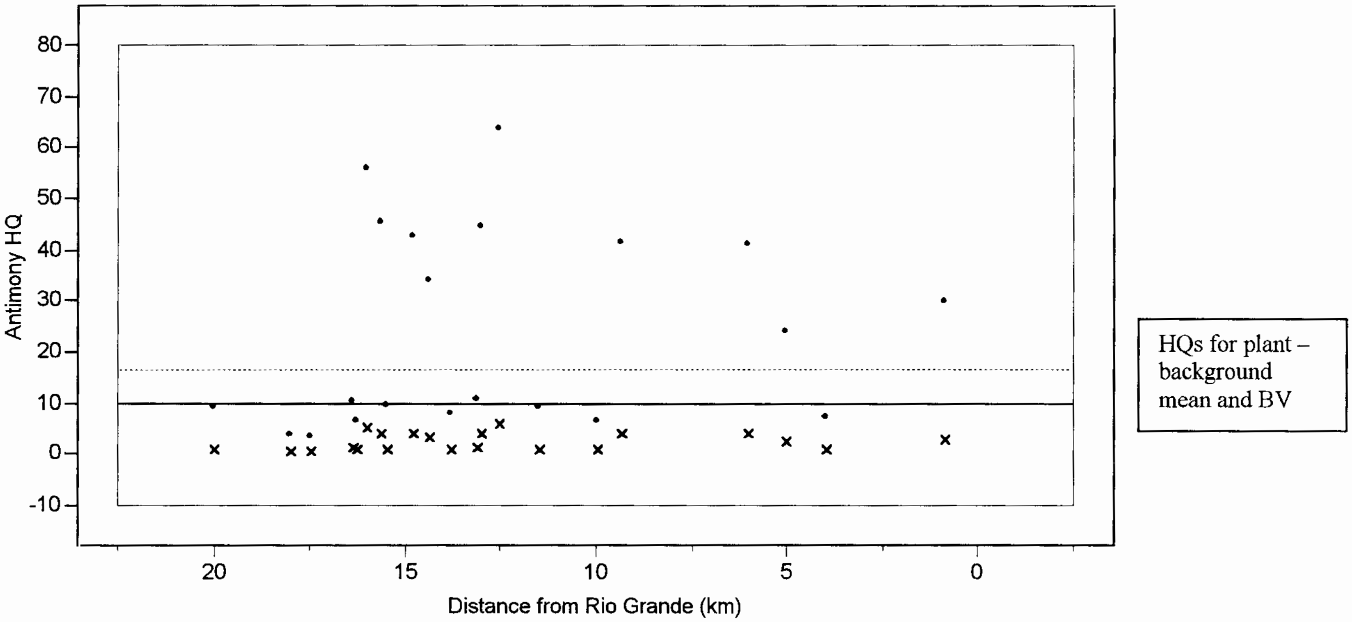
HI for all COPECs plotted by Distance and Canyons Marked with Different Symbols



HI for 10 COPECs plotted by Distance and Canyons Marked with Different Symbols

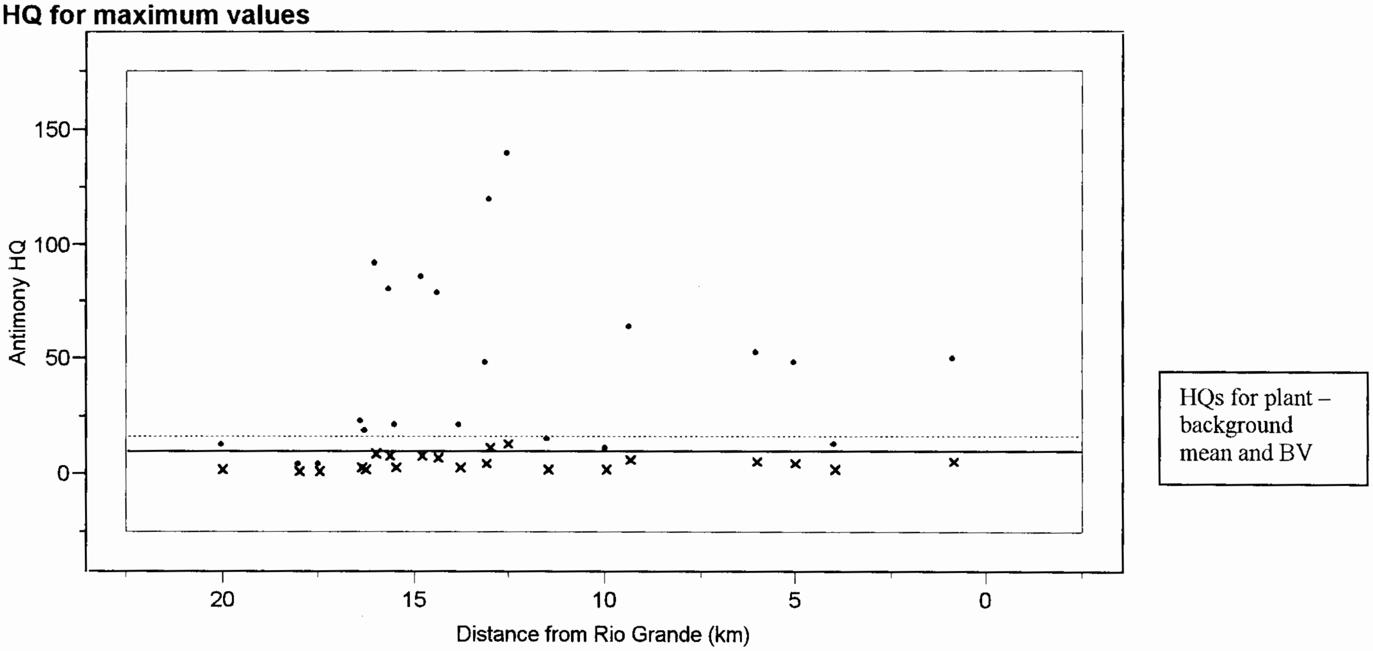


LA/DP Canyons Plot
HQ for mean values



Y ✕ Shrew HQ - mean ◘ Robin-I HQ - mean
◆ Plant HQ - mean △ Invert HQ - mean

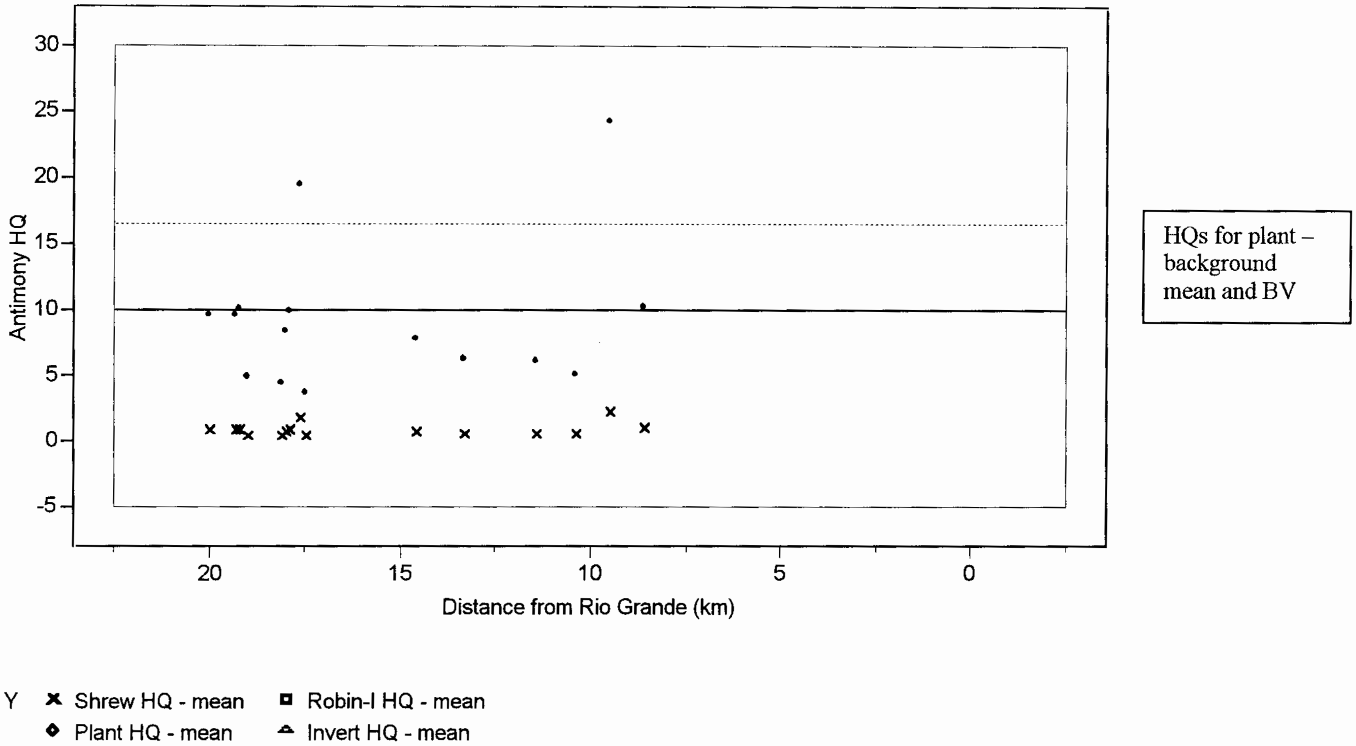
HQ for maximum values



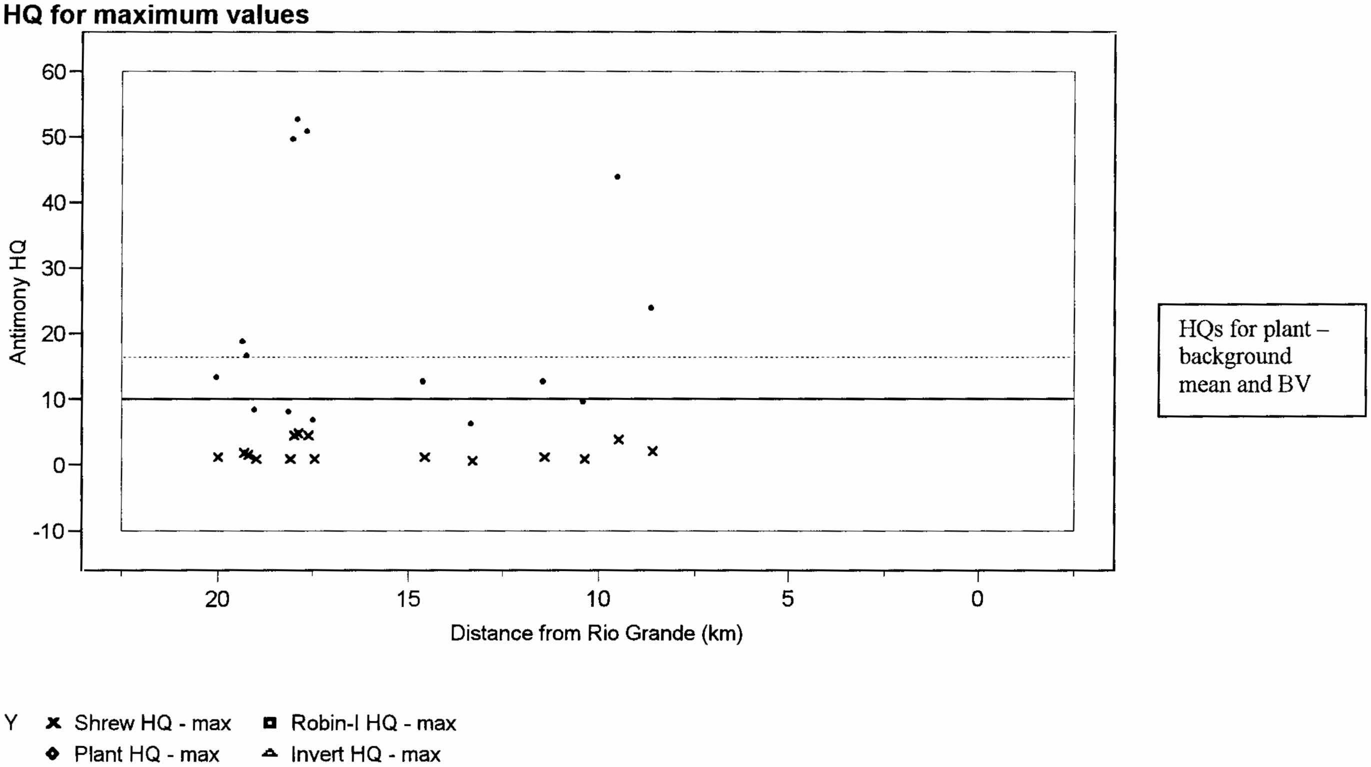
Y ✕ Shrew HQ - max ◘ Robin-I HQ - max
◆ Plant HQ - max △ Invert HQ - max

Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

Acid/Pueblo Canyons Plot
HQ for mean values

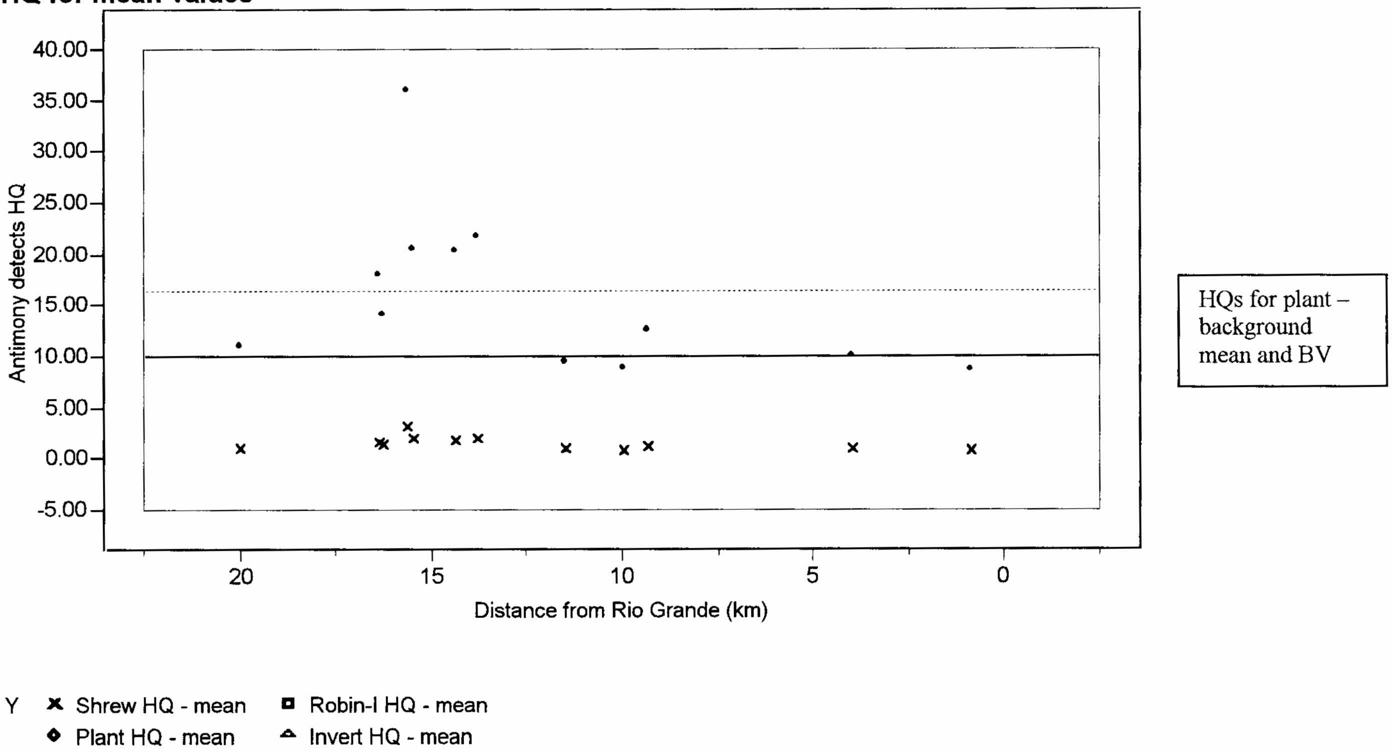


HQ for maximum values

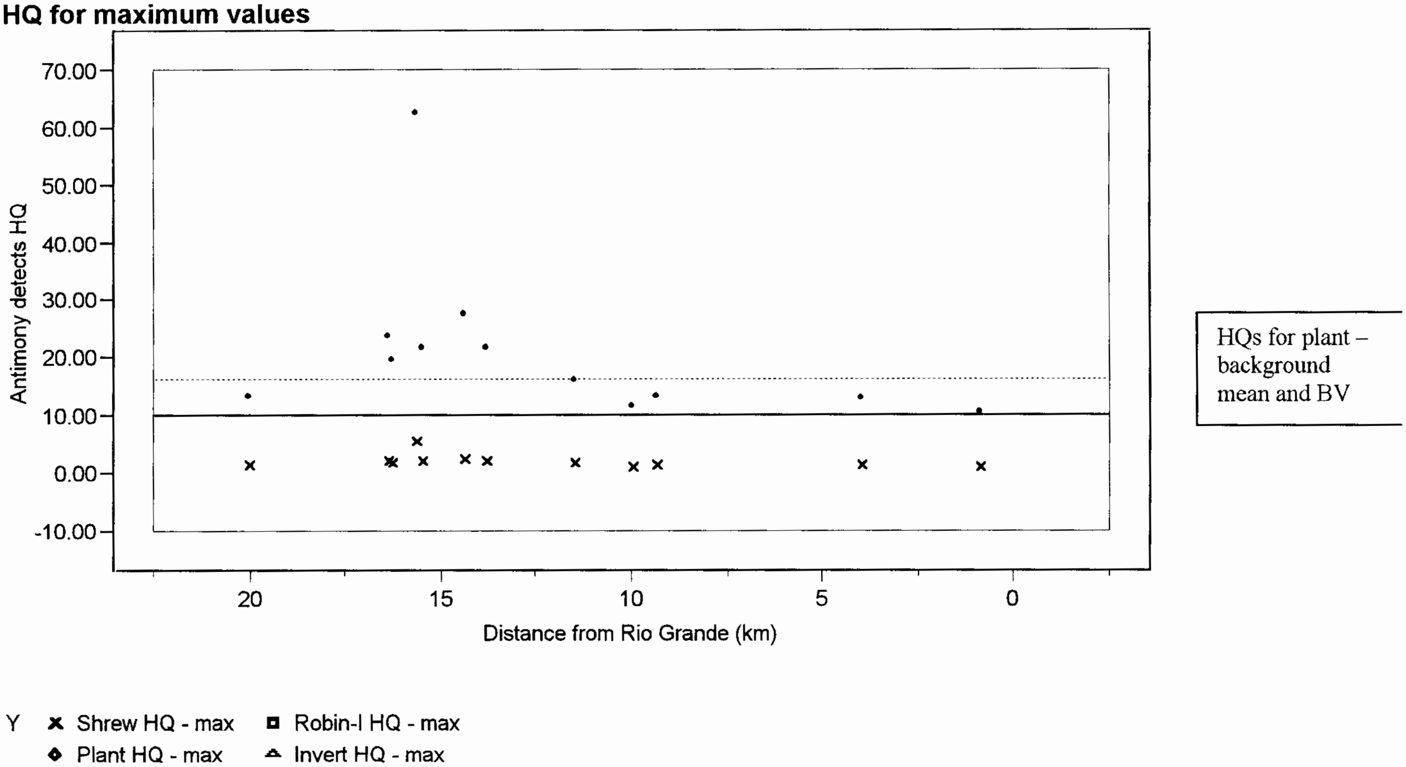


Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

LA/DP Canyons Plot
HQ for mean values

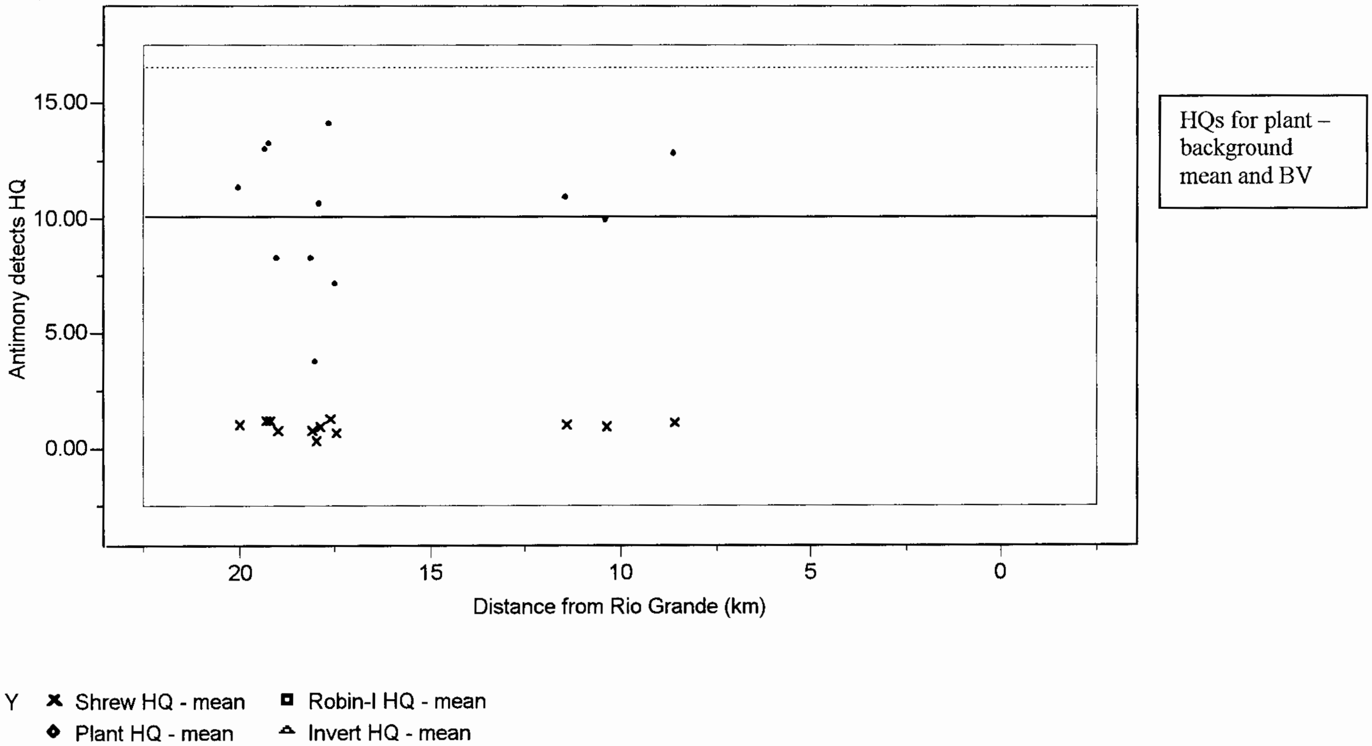


HQ for maximum values

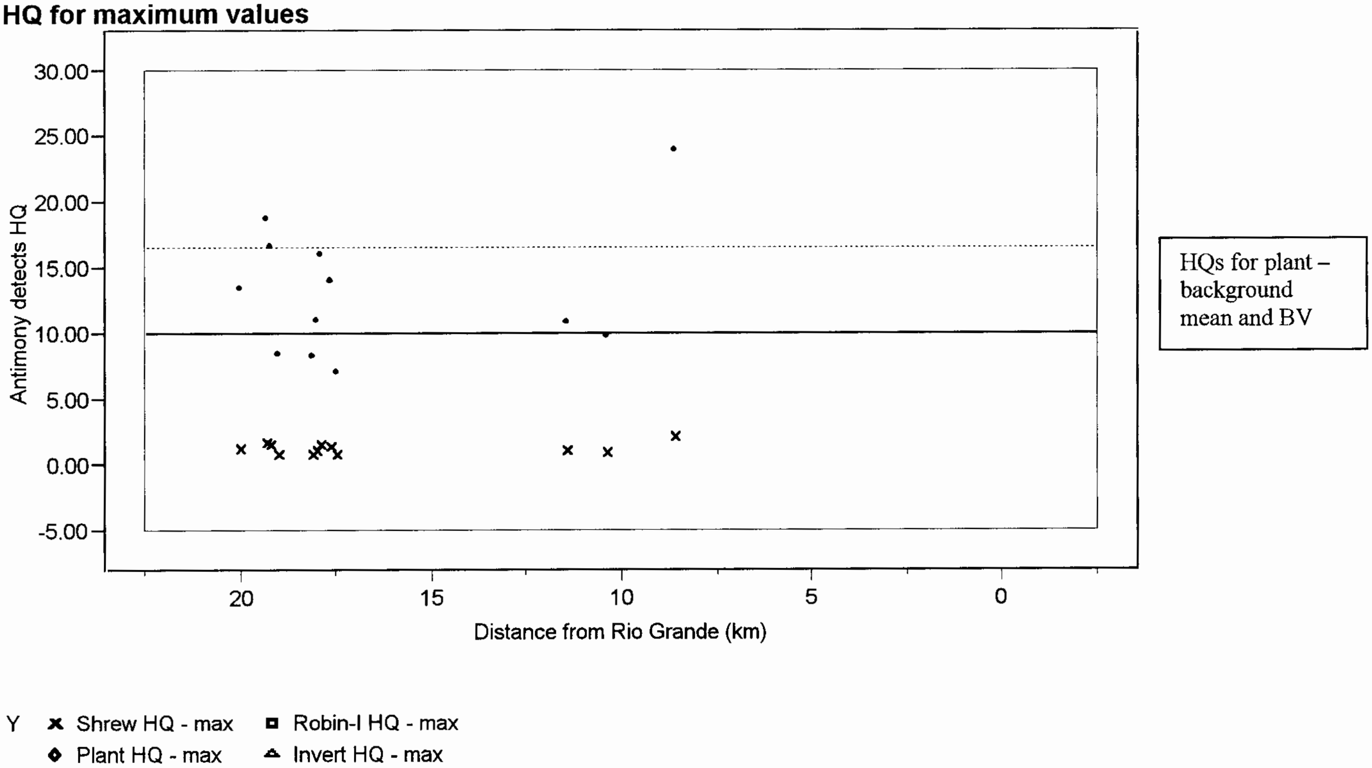


Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

Acid/Pueblo Canyons Plot
HQ for mean values

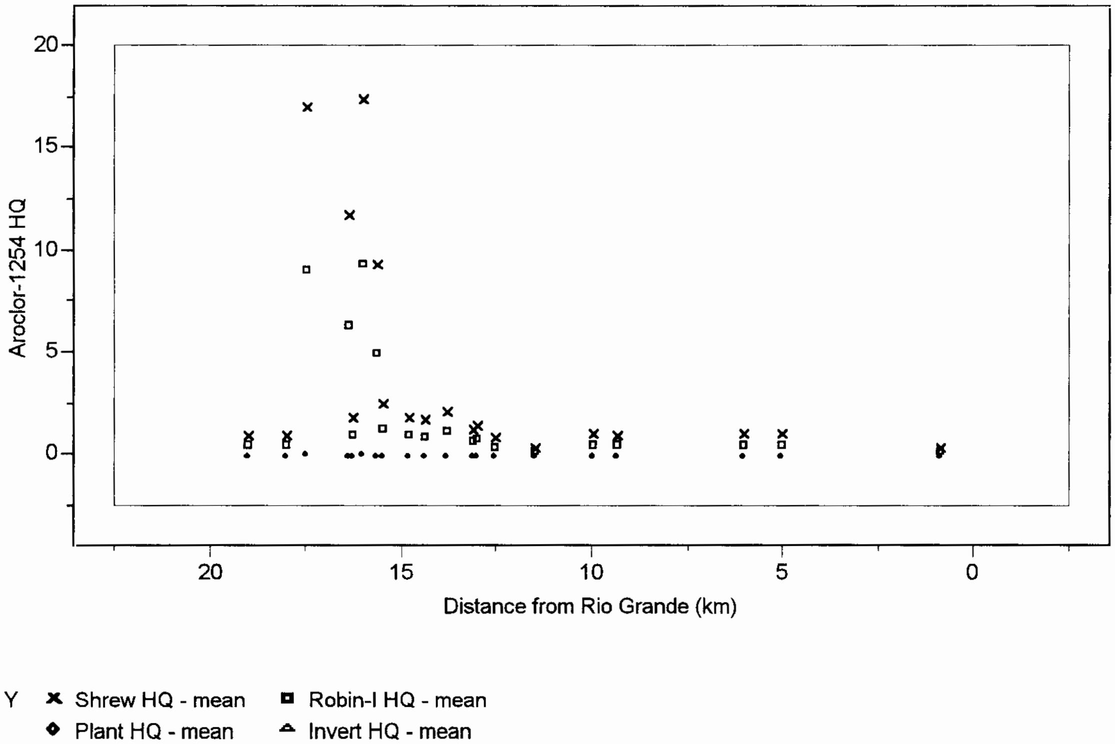


HQ for maximum values

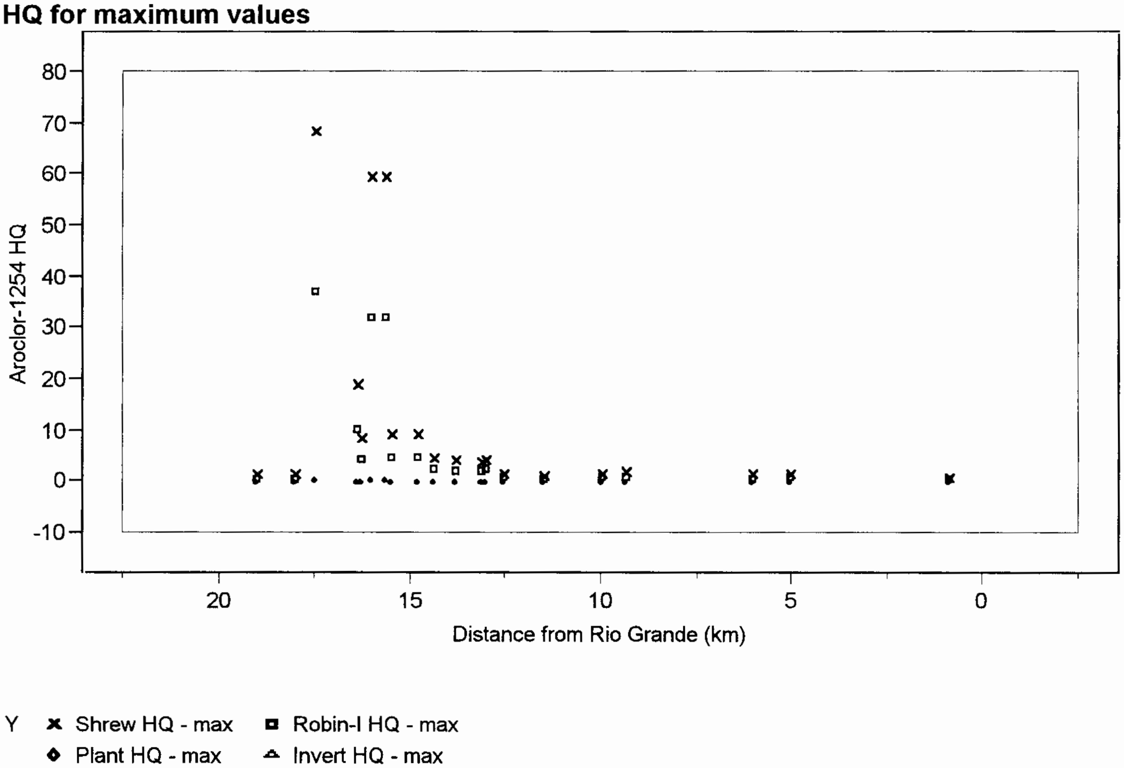


Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

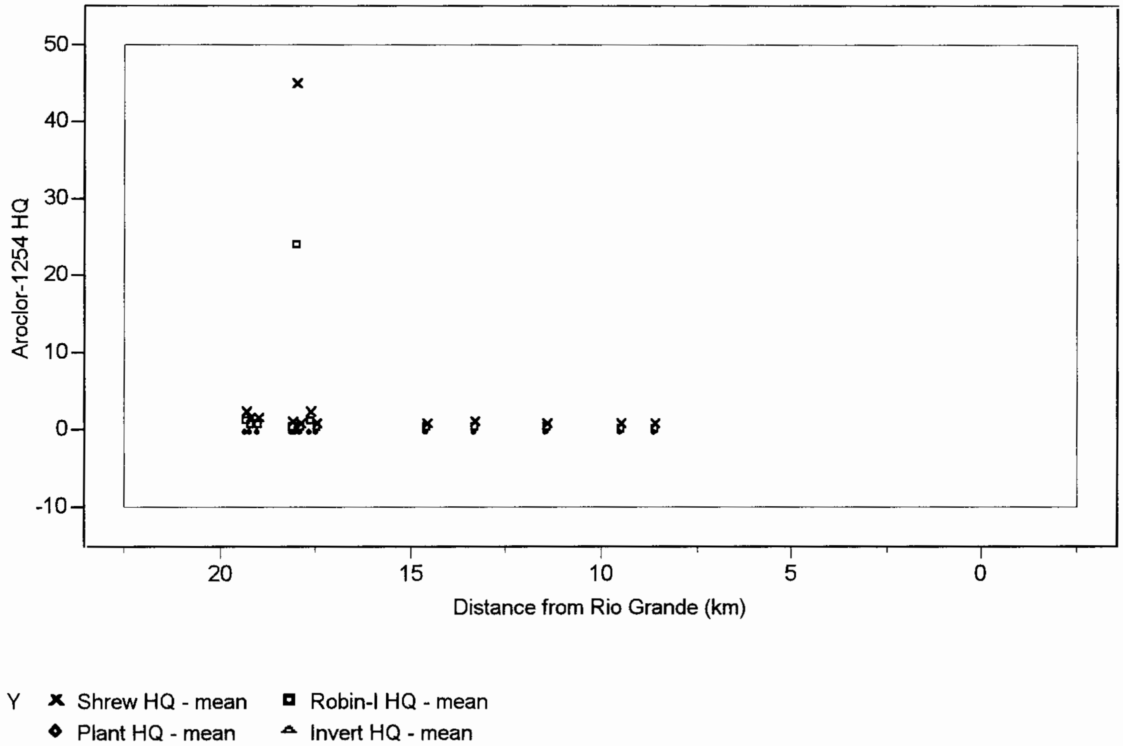
LA/DP Canyons Plot
HQ for mean values



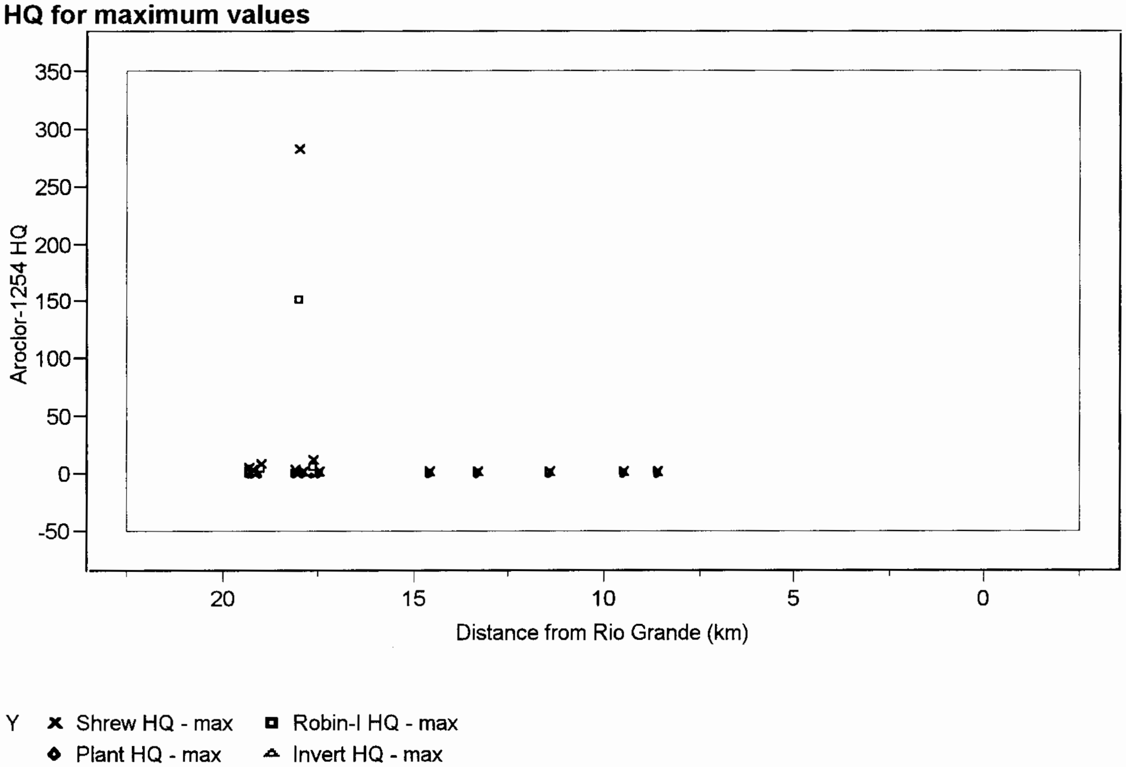
HQ for maximum values



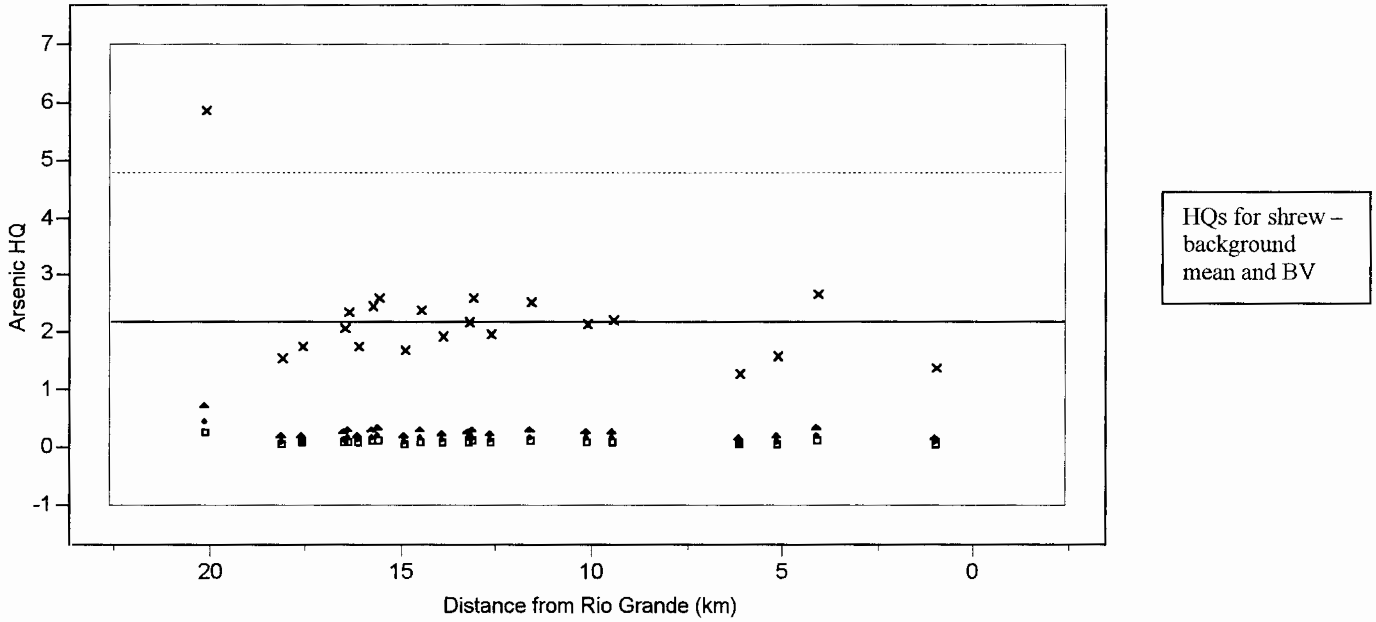
Acid/Pueblo Canyons Plot
HQ for mean values



HQ for maximum values

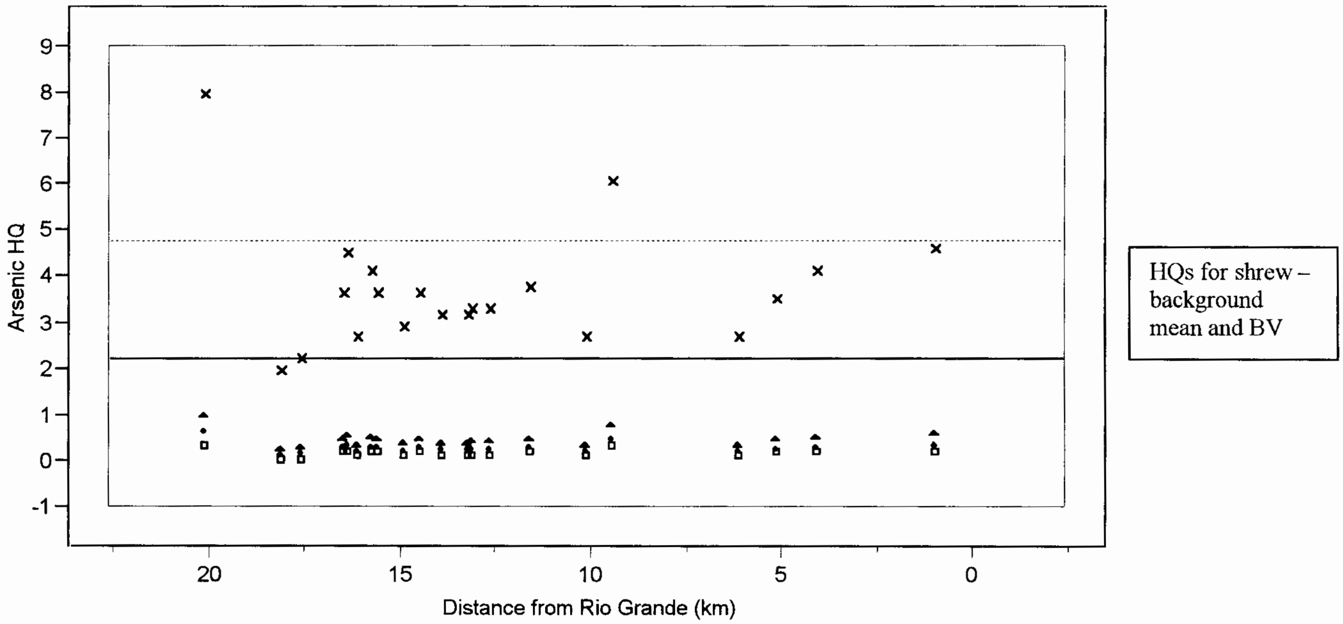


LA/DP Canyons Plot
HQ for mean values



Y ✕ Shrew HQ - mean ◘ Robin-I HQ - mean
◆ Plant HQ - mean ▲ Invert HQ - mean

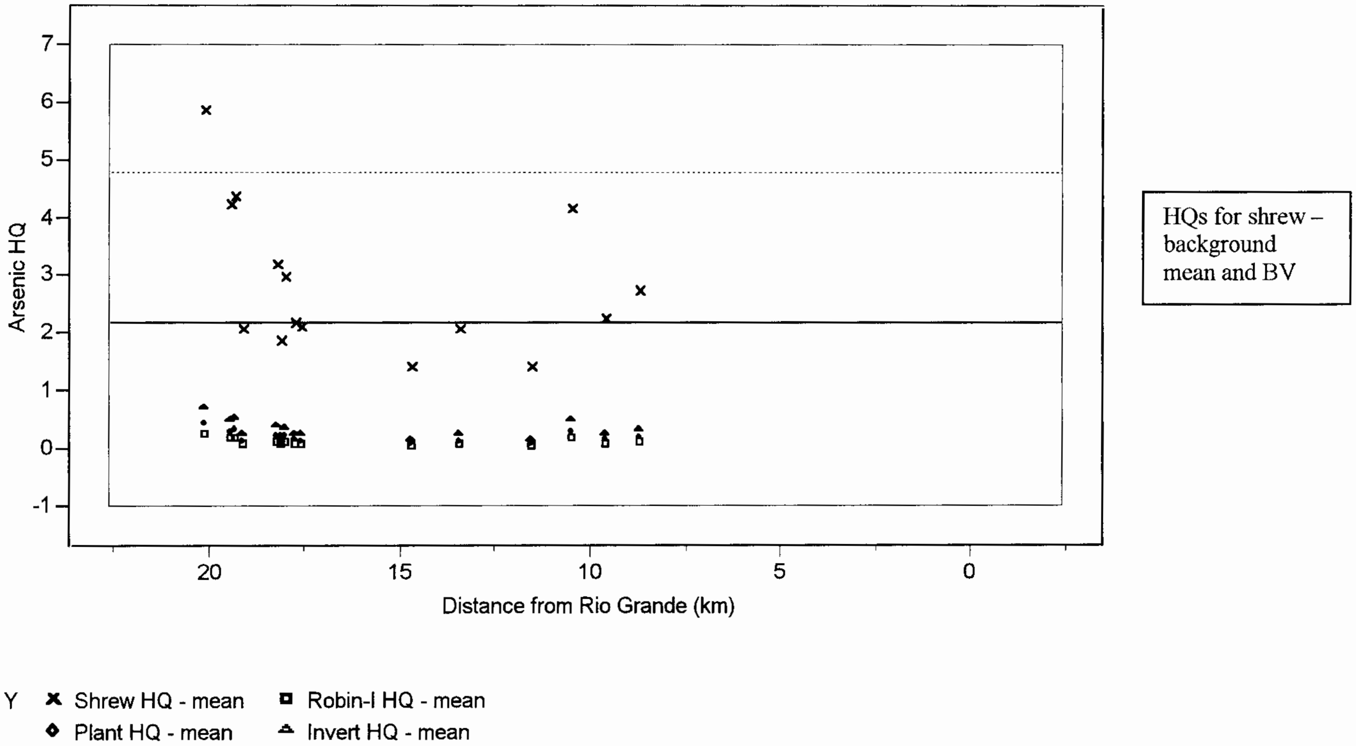
HQ for maximum values



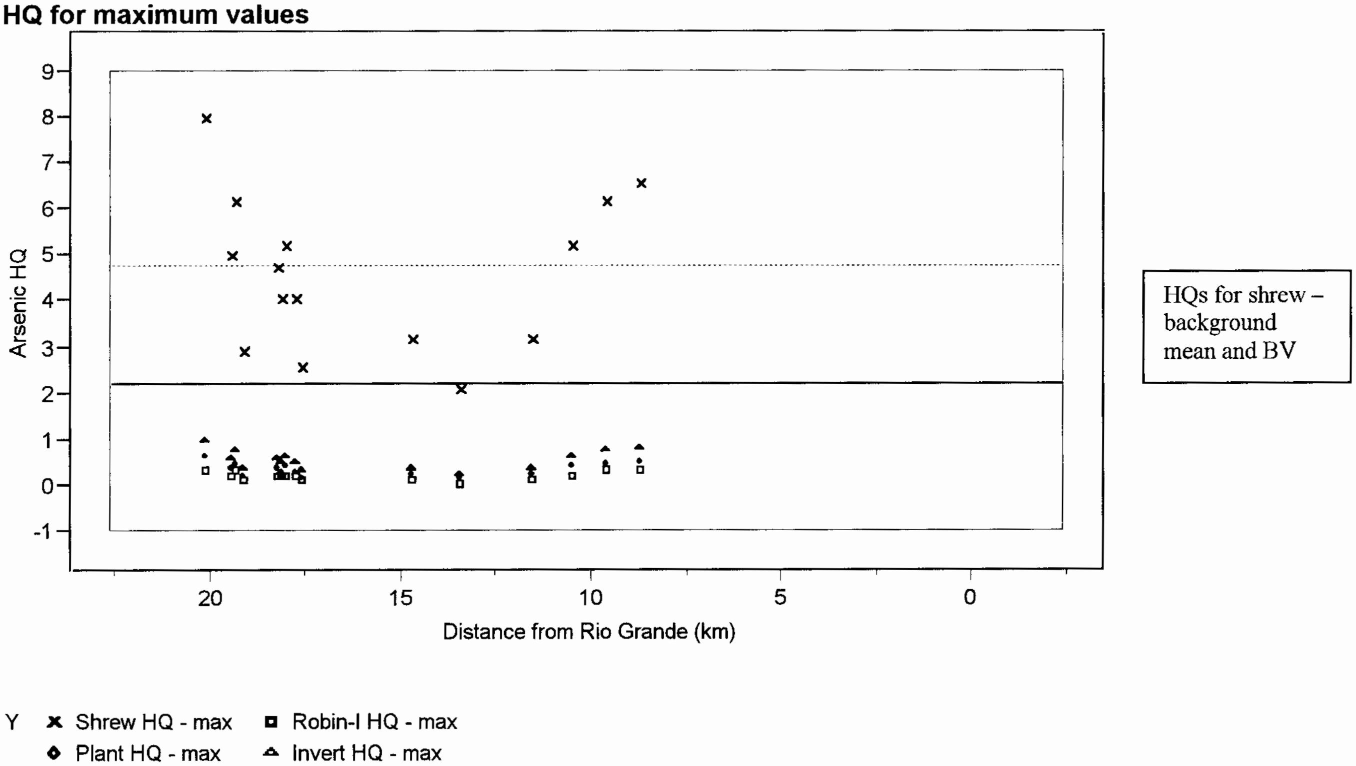
Y ✕ Shrew HQ - max ◘ Robin-I HQ - max
◆ Plant HQ - max ▲ Invert HQ - max

Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

Acid/Pueblo Canyons Plot
HQ for mean values

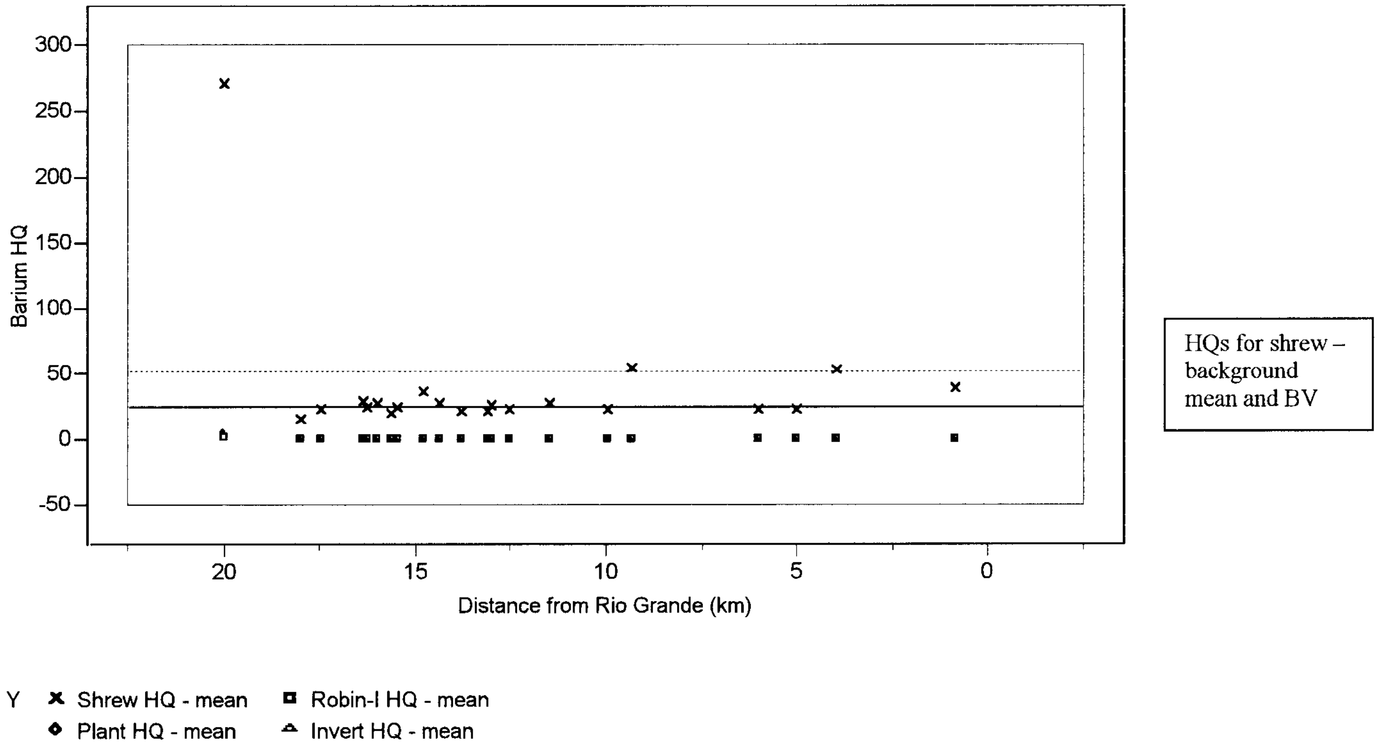


HQ for maximum values

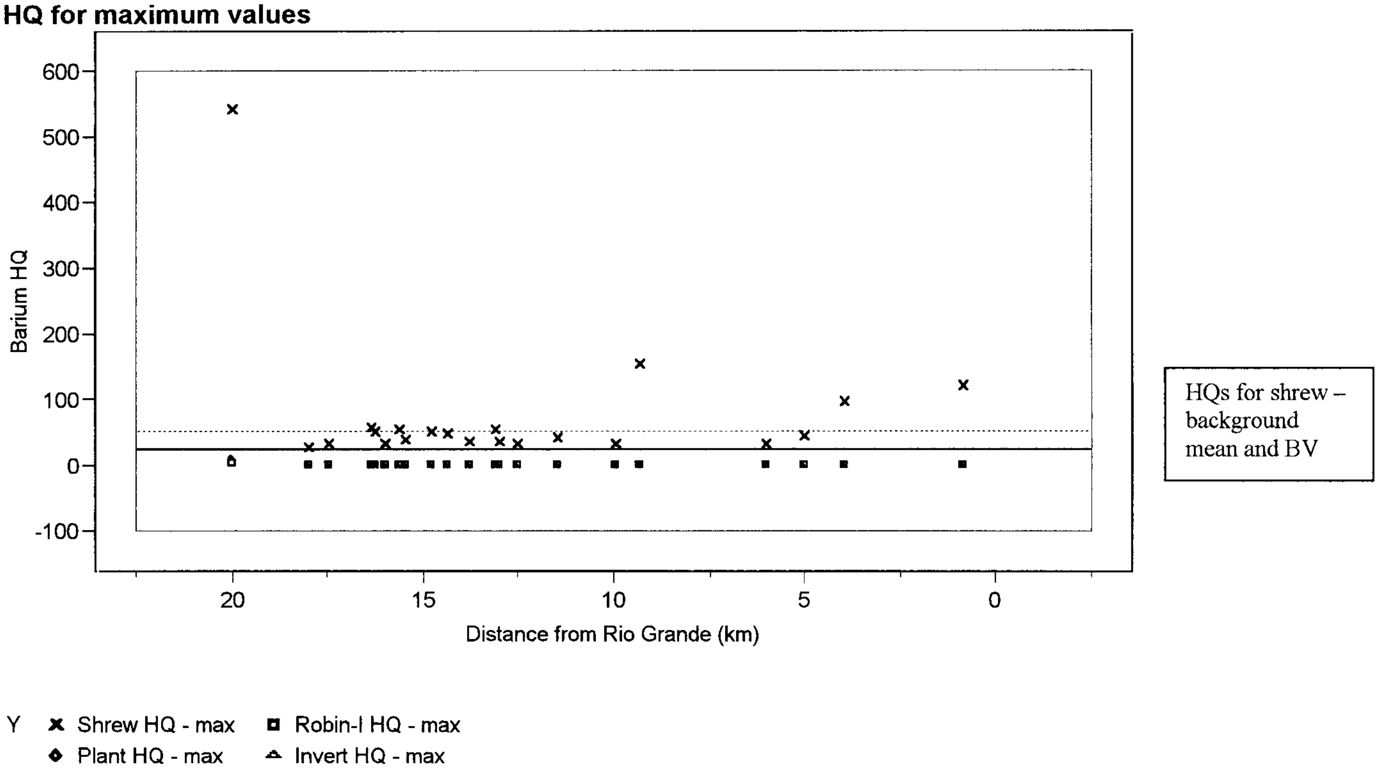


Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

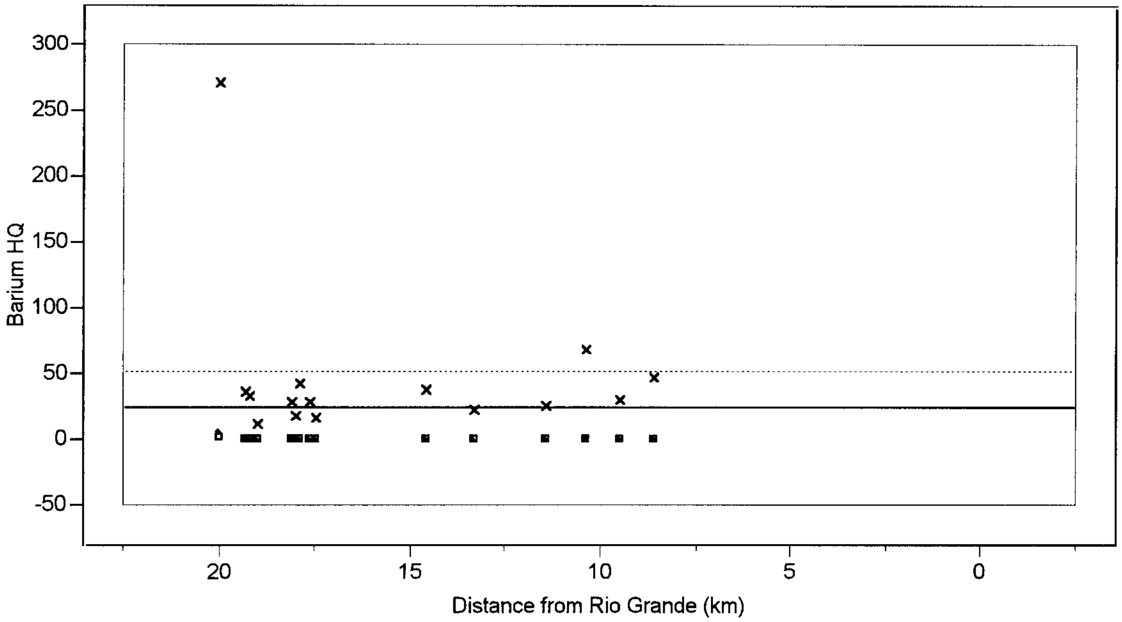
LA/DP Canyons Plot
HQ for mean values



HQ for maximum values



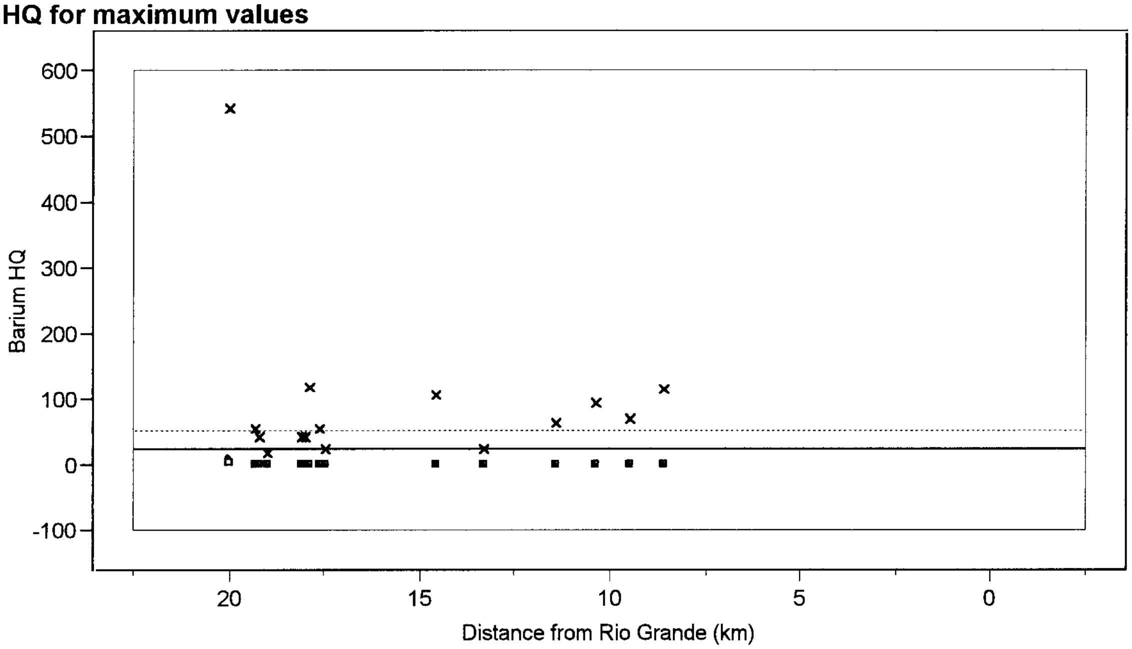
Acid/Pueblo Canyons Plot
HQ for mean values



HQs for shrew – background mean and BV

Y Shrew HQ - mean Robin-I HQ - mean
Plant HQ - mean Invert HQ - mean

HQ for maximum values

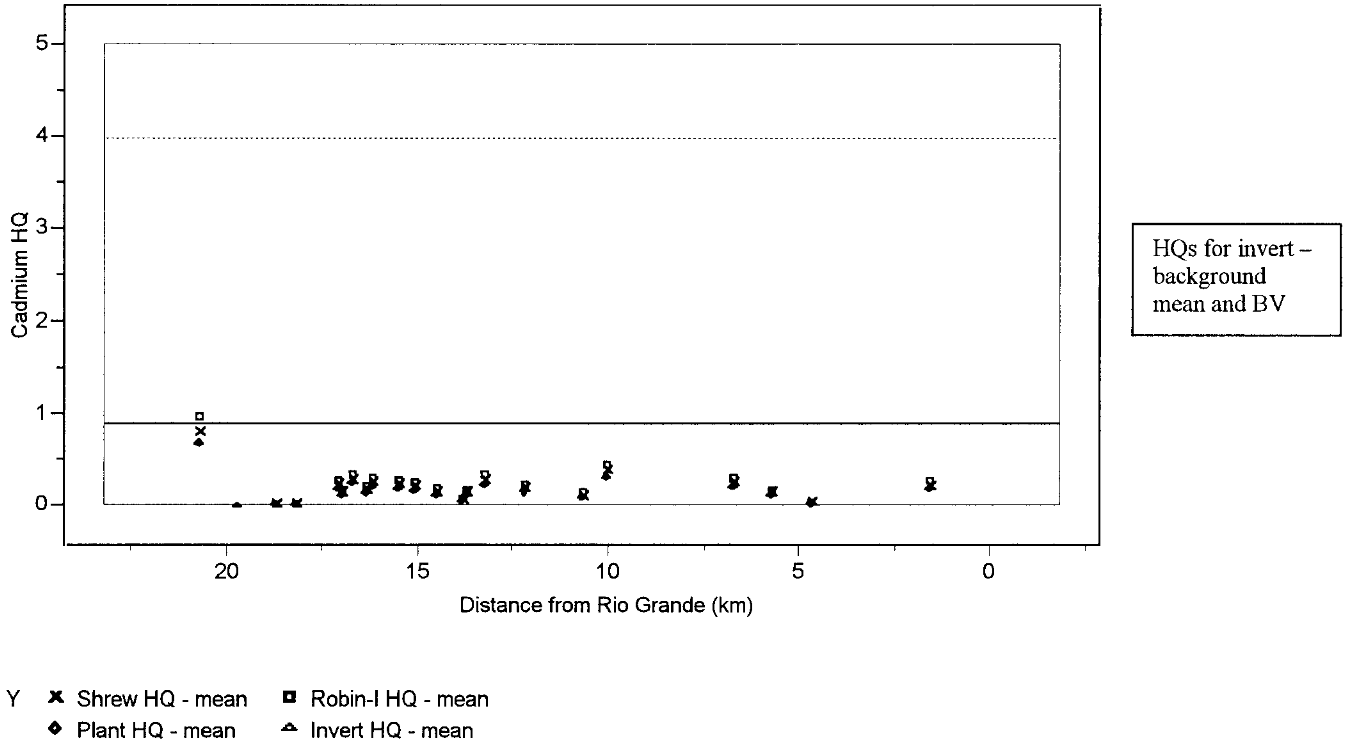


HQs for shrew – background mean and BV

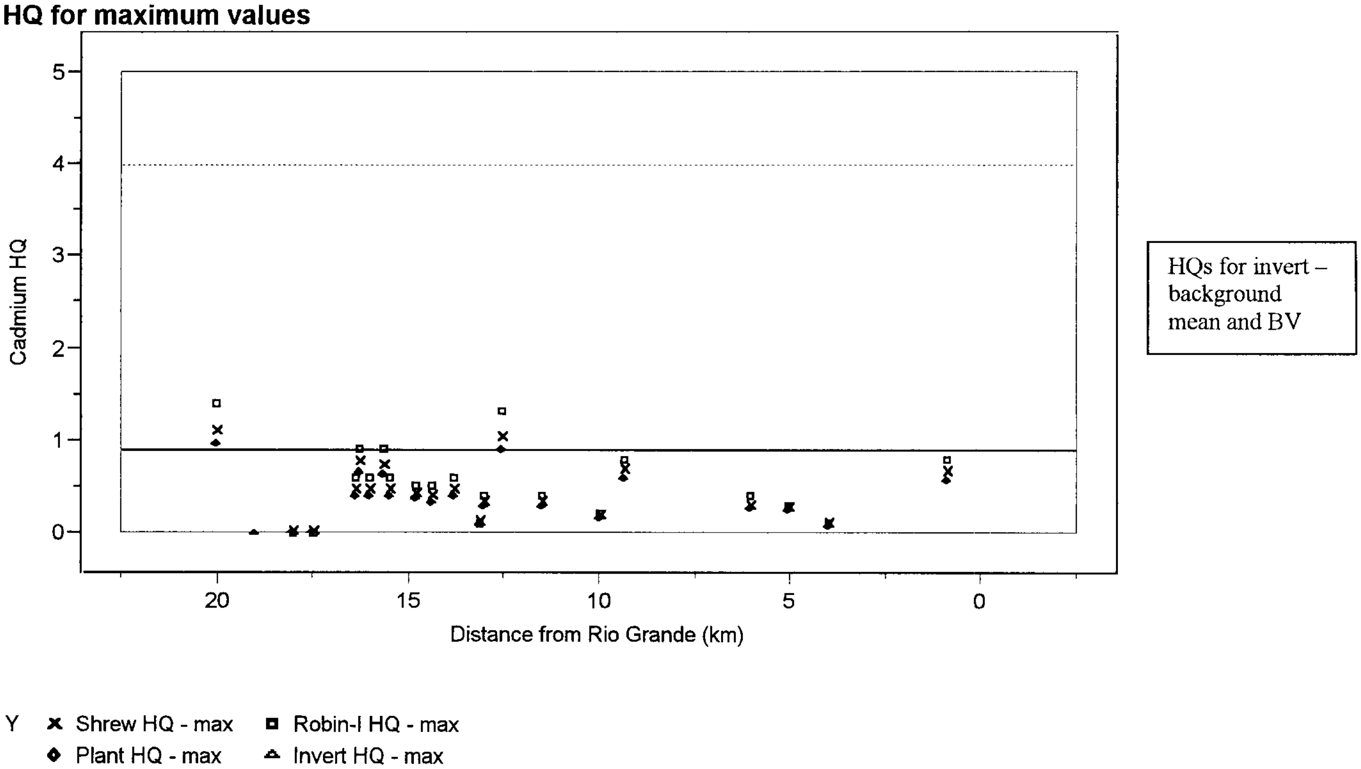
Y Shrew HQ - max Robin-I HQ - max
Plant HQ - max Invert HQ - max

Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

LA/DP Canyons Plot
HQ for mean values

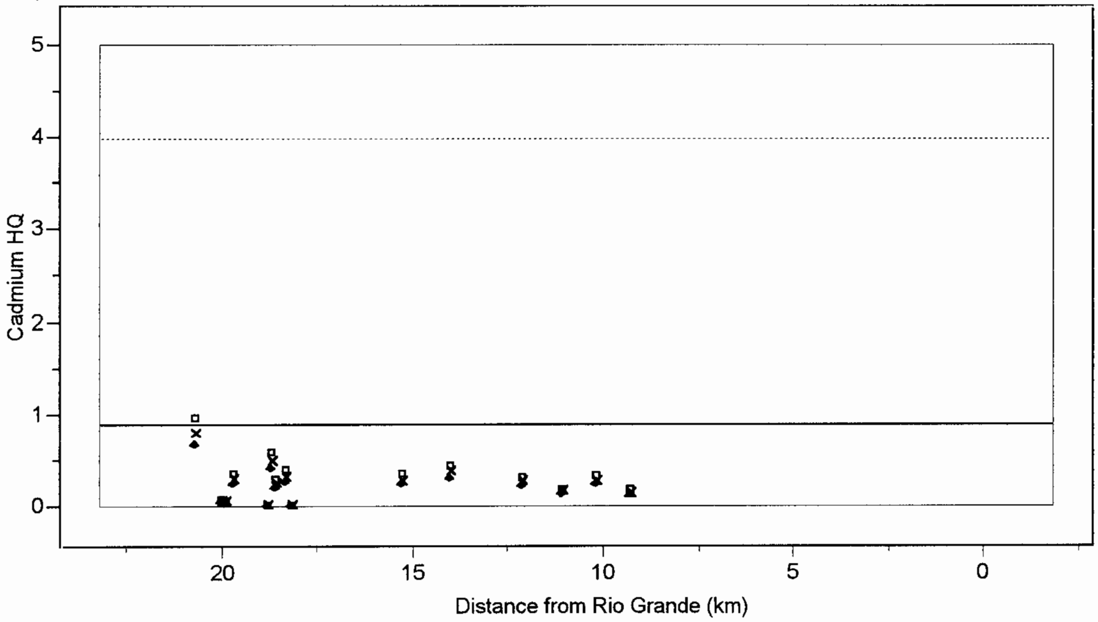


HQ for maximum values



Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

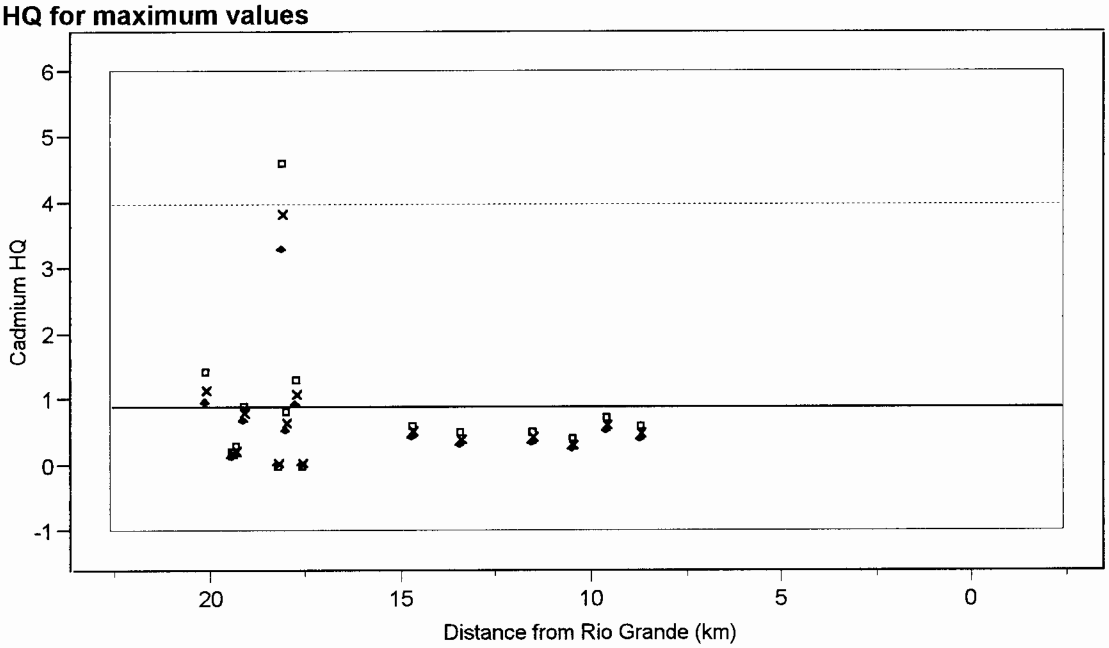
Acid/Pueblo Canyons Plot
HQ for mean values



HQs for invert – background mean and BV

Y ✕ Shrew HQ - mean ◘ Robin-I HQ - mean
◆ Plant HQ - mean ▲ Invert HQ - mean

HQ for maximum values

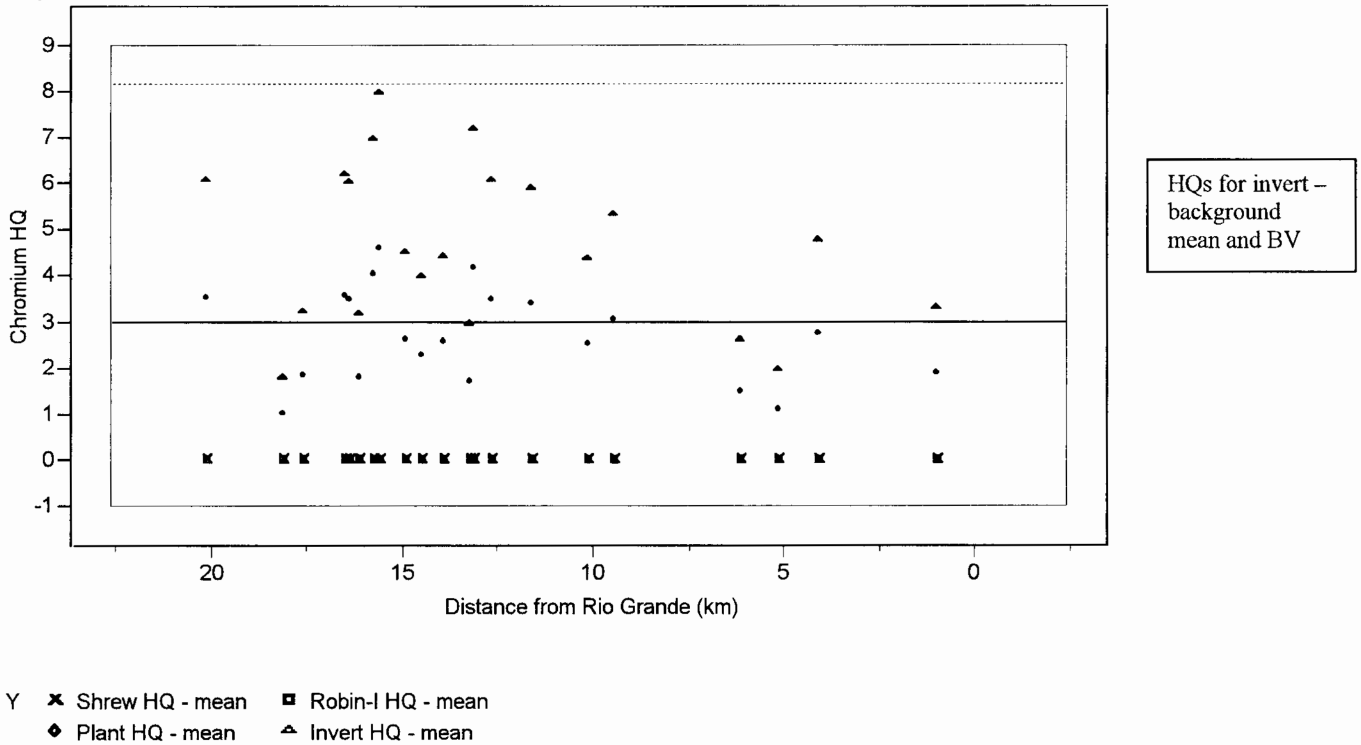


HQs for invert – background mean and BV

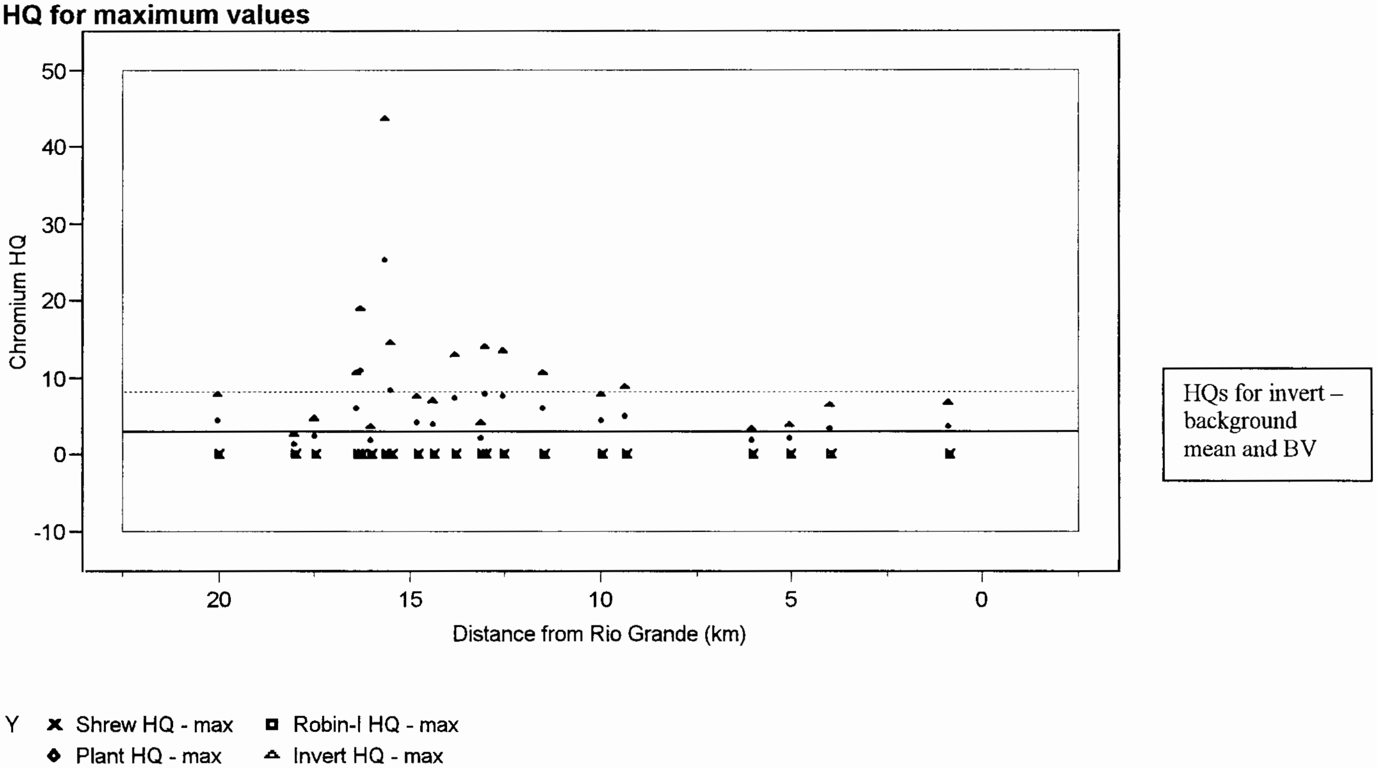
Y ✕ Shrew HQ - max ◘ Robin-I HQ - max
◆ Plant HQ - max ▲ Invert HQ - max

Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

LA/DP Canyons Plot
HQ for mean values

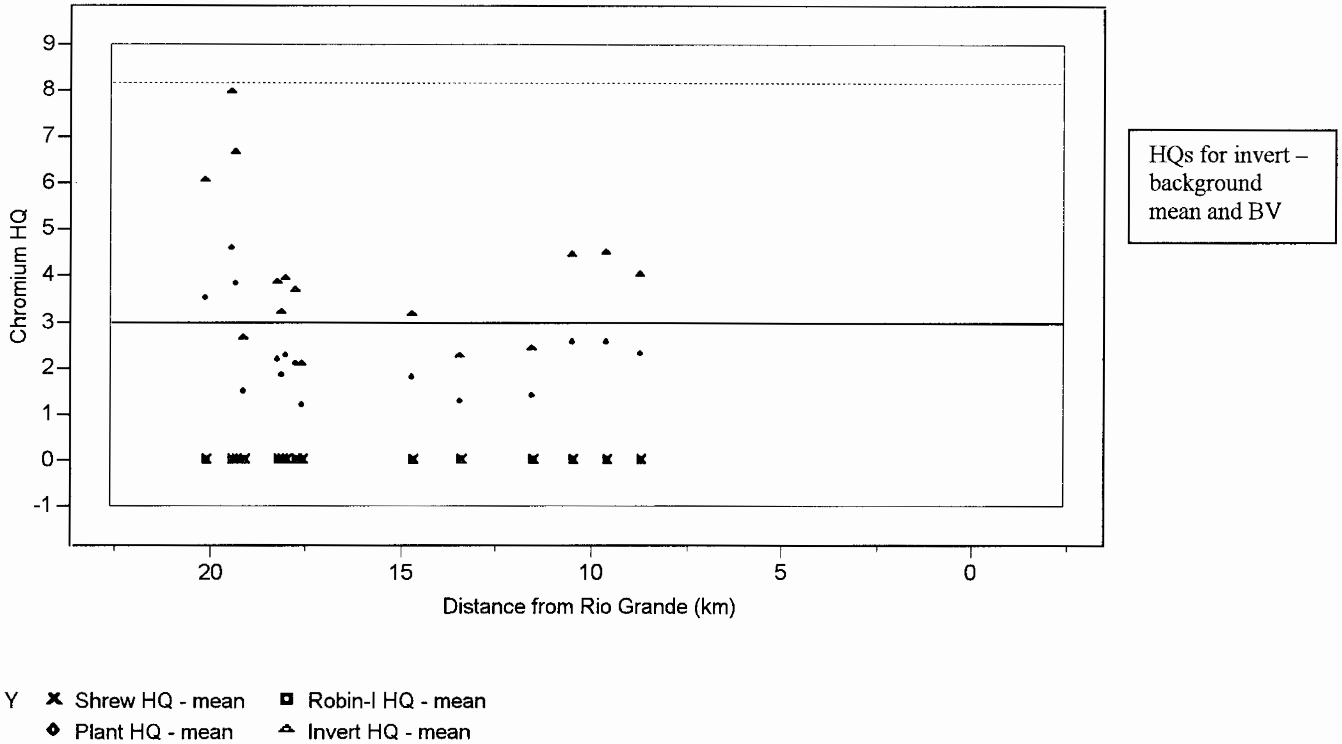


HQ for maximum values

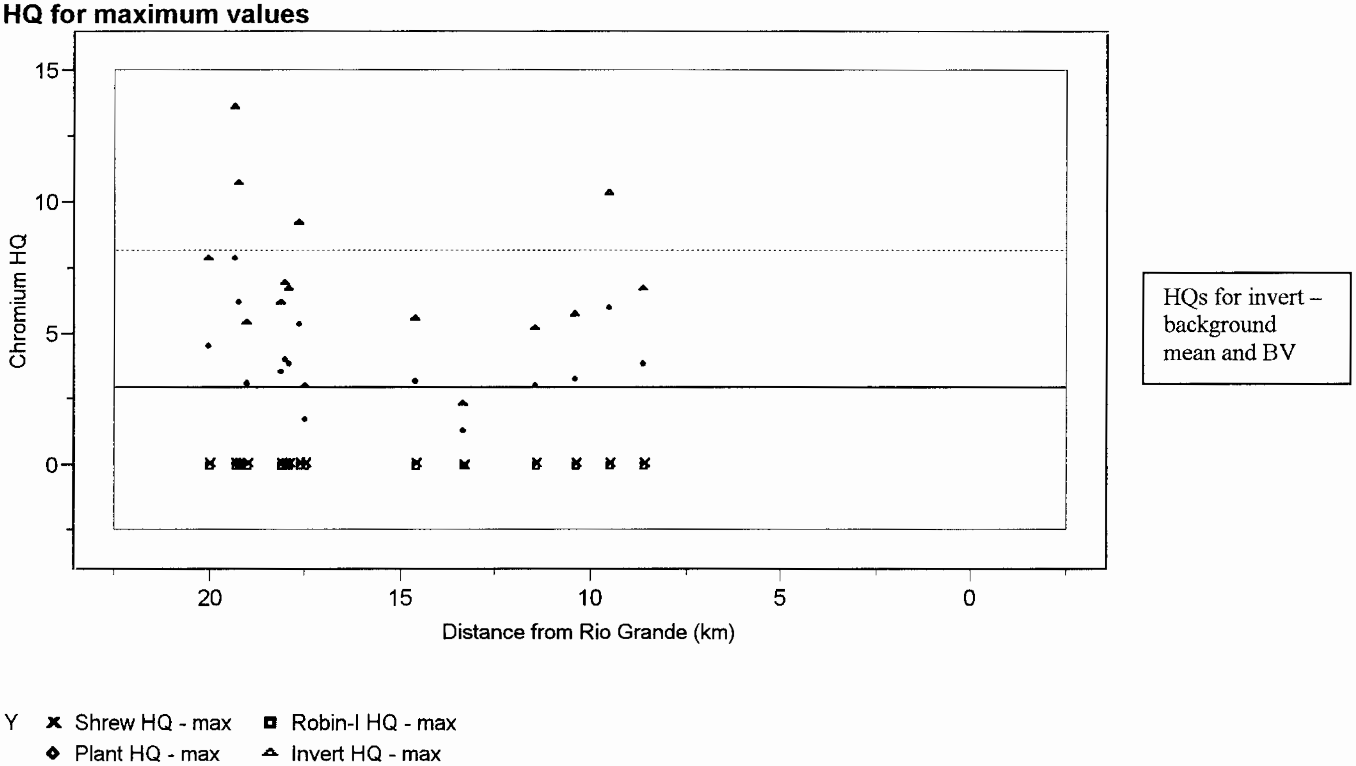


Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

Acid/Pueblo Canyons Plot
HQ for mean values



HQ for maximum values



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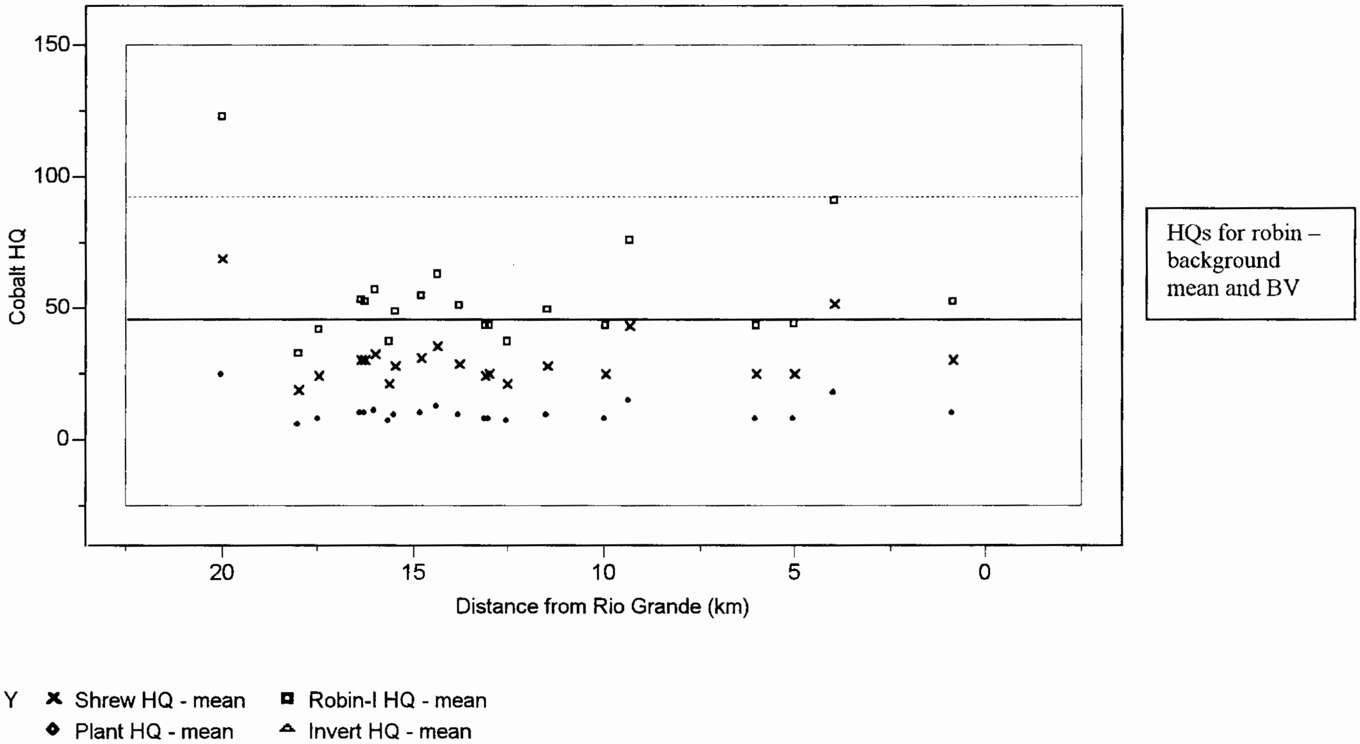
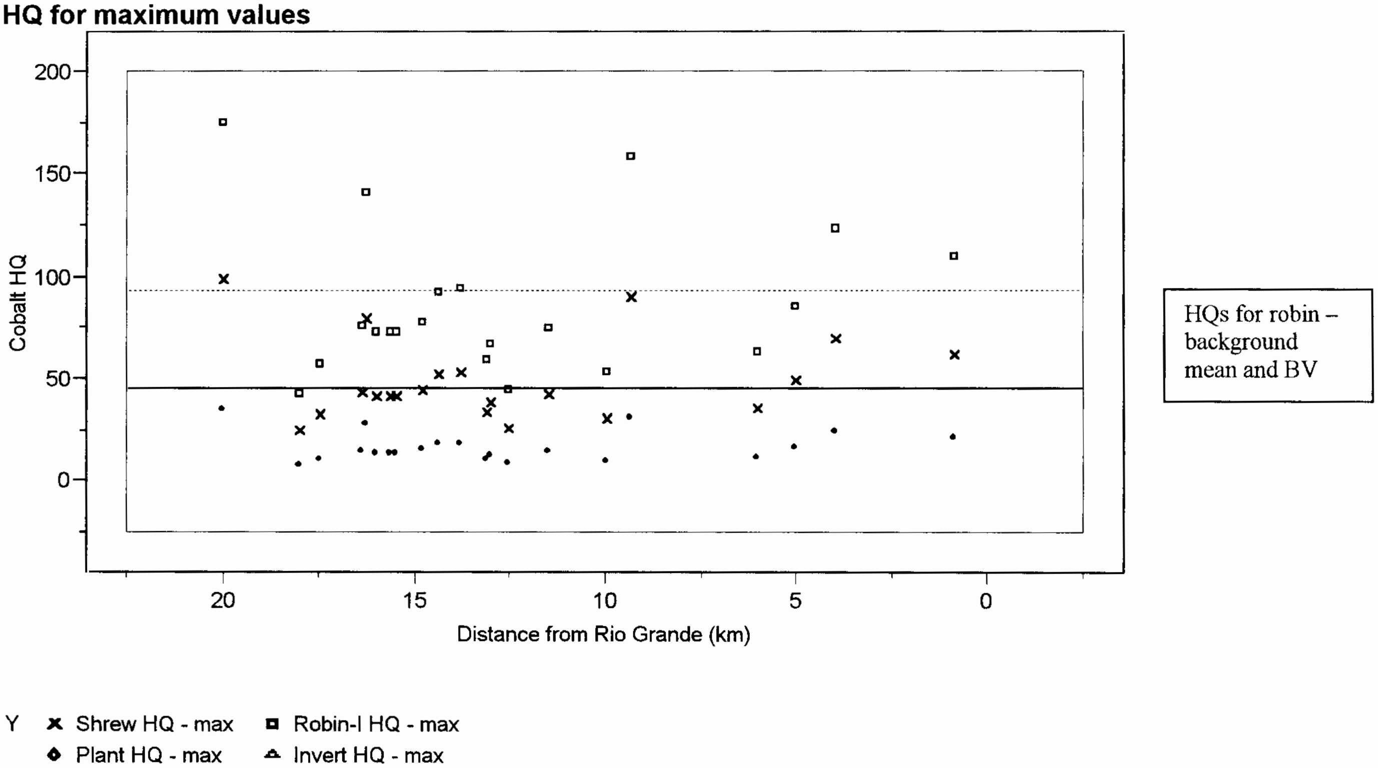
LA/DP Canyons Plot
HQ for mean values



HQ for maximum values



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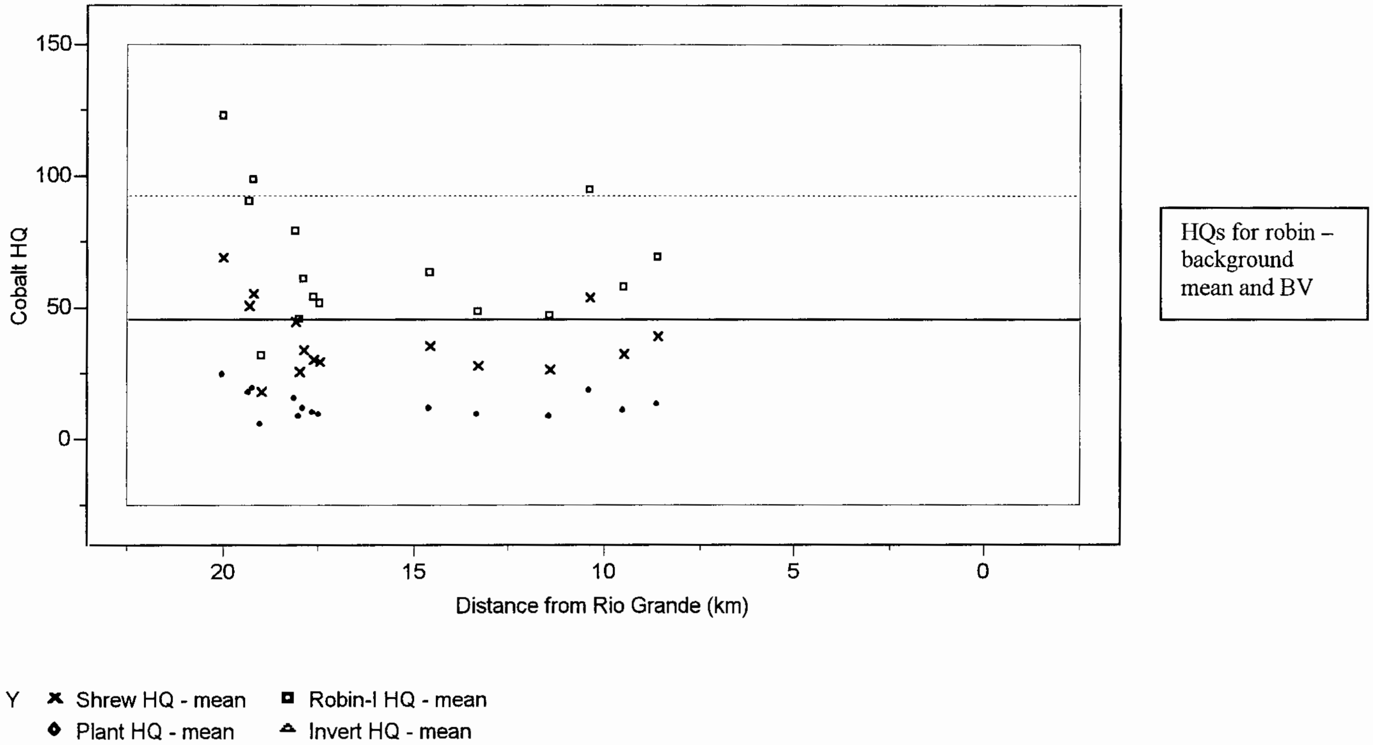
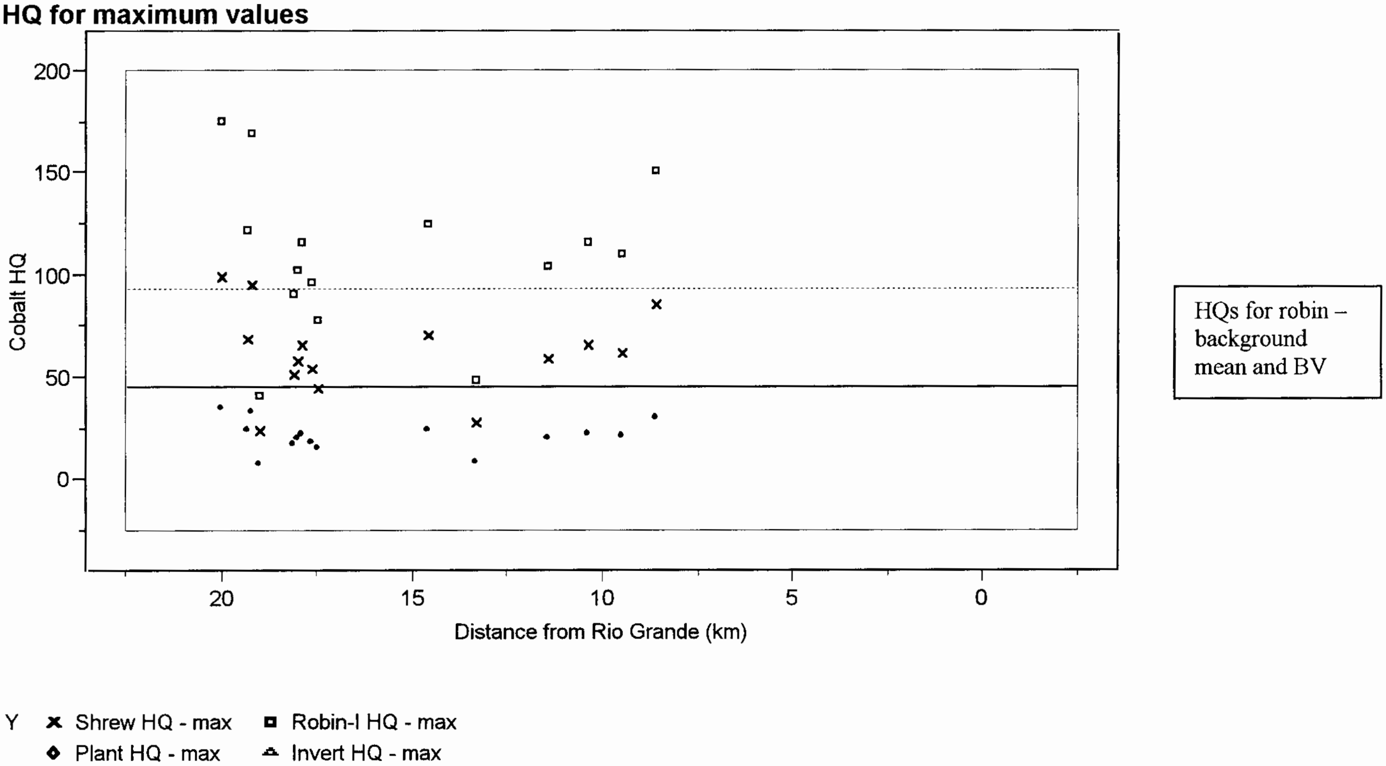
Acid/Pueblo Canyons Plot
HQ for mean values



HQ for maximum values



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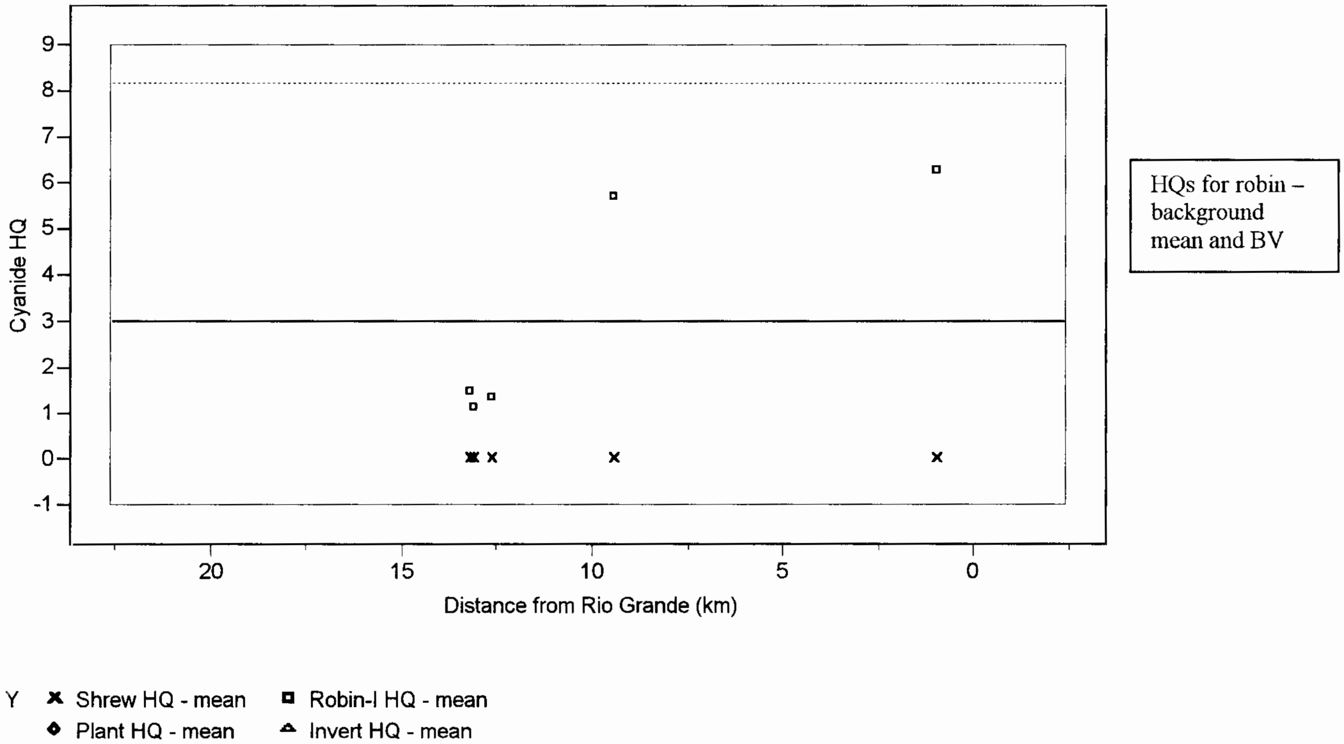
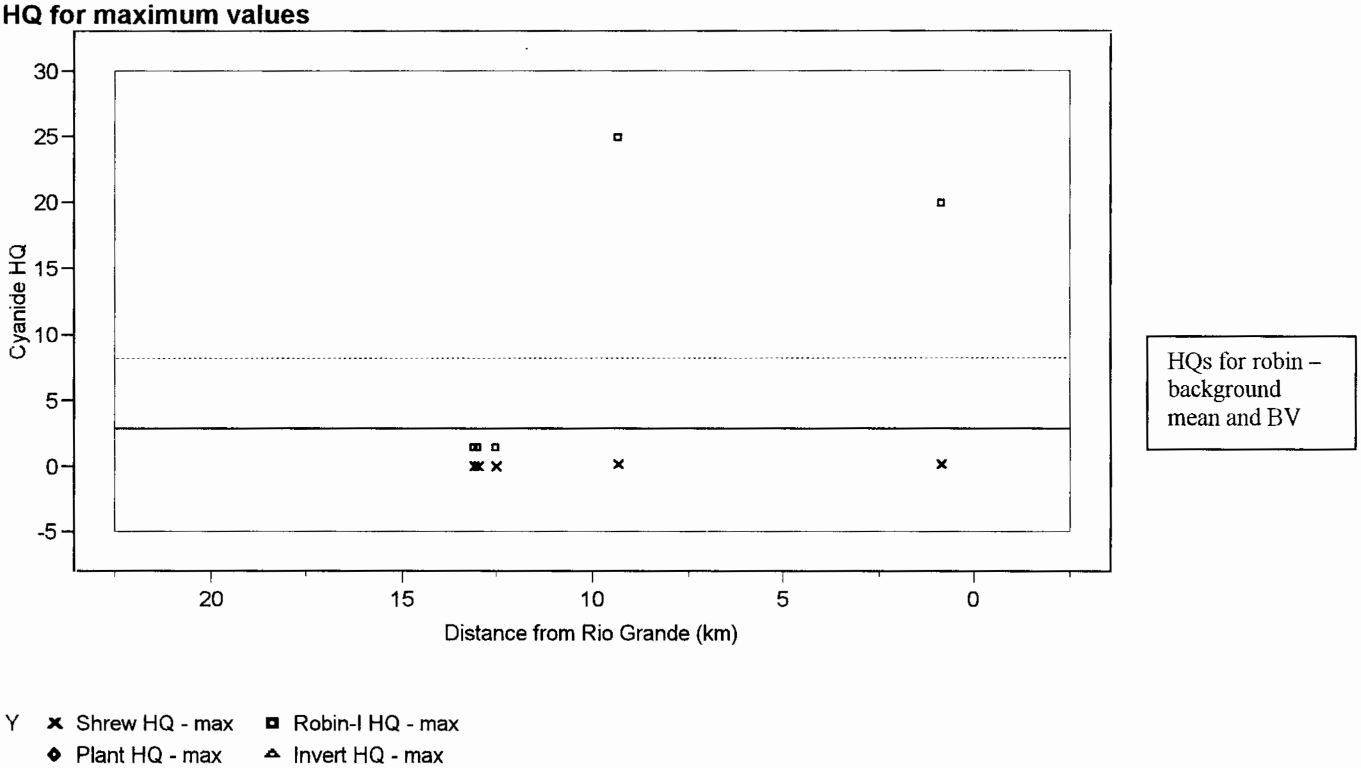
LA/DP Canyons Plot
HQ for mean values



HQ for maximum values



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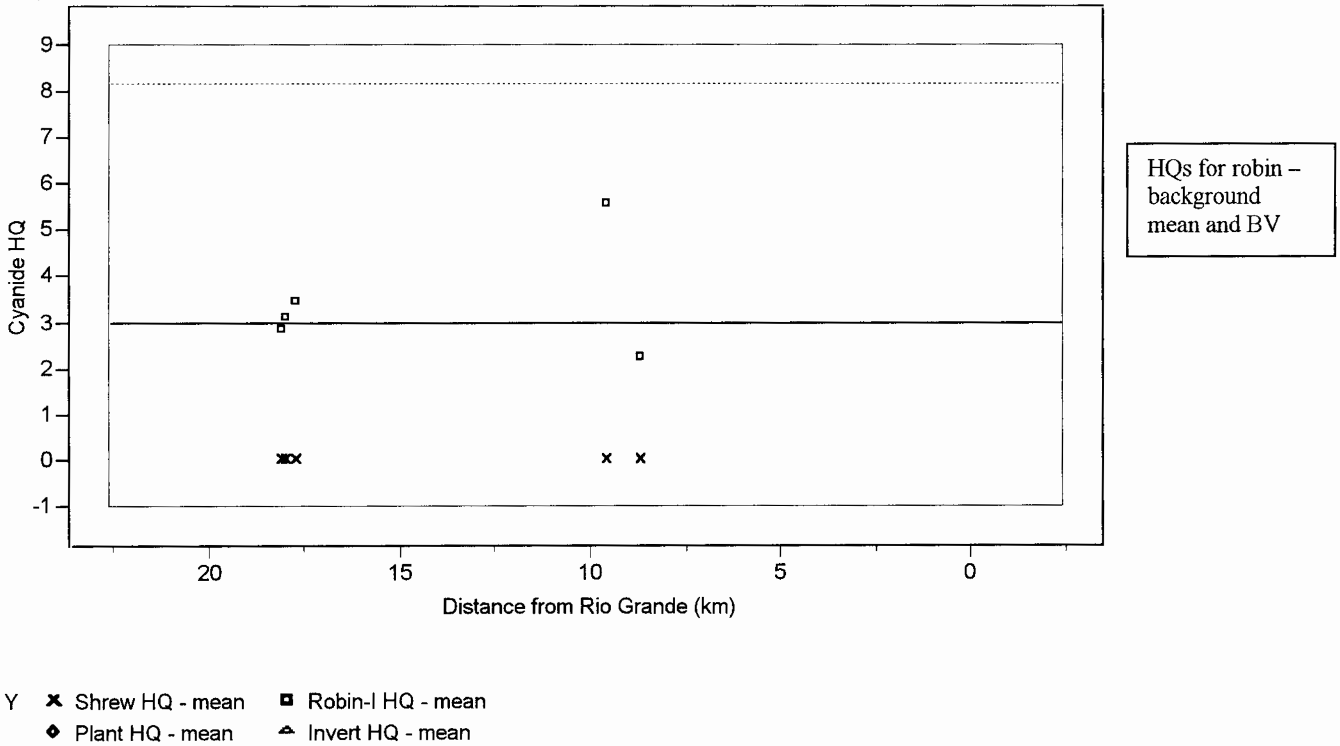
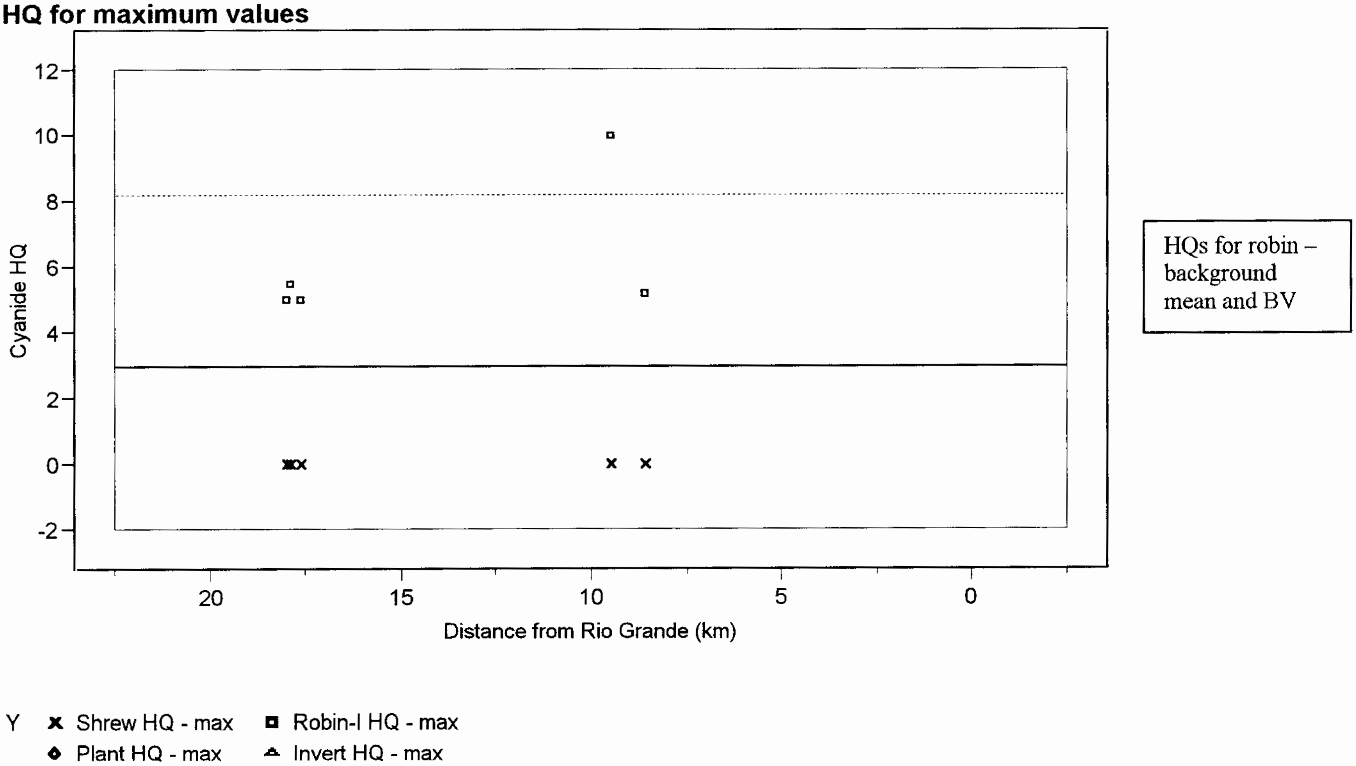
Acid/Pueblo Canyons Plot
HQ for mean values



HQ for maximum values



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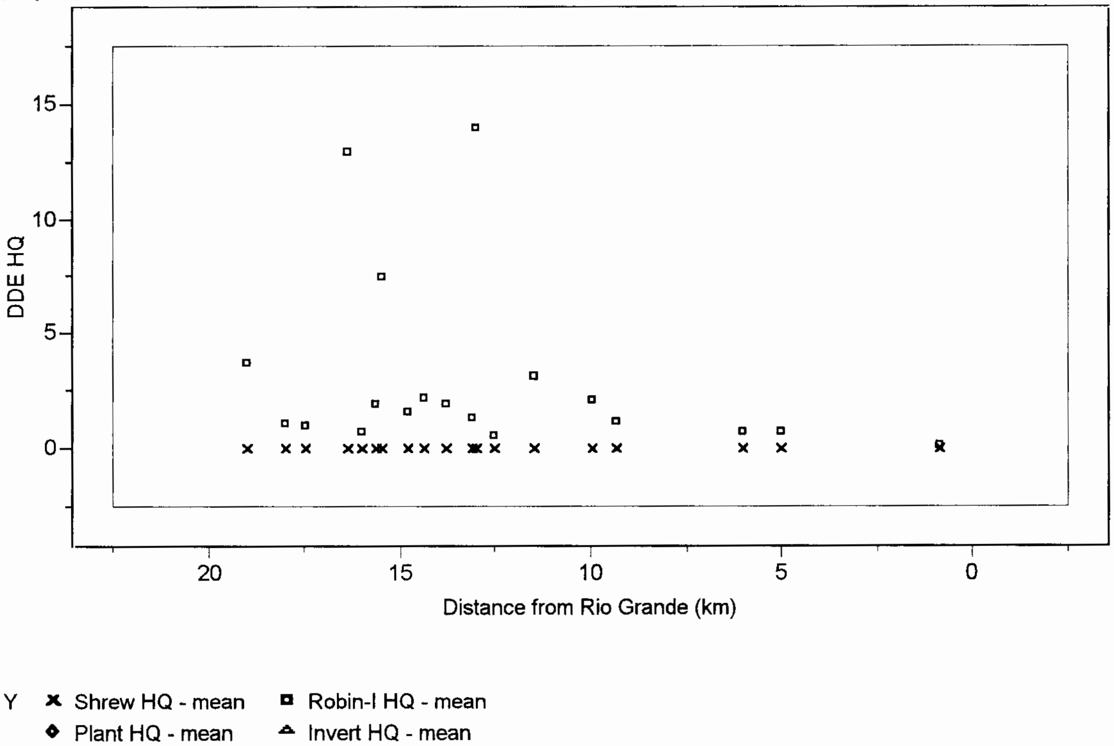
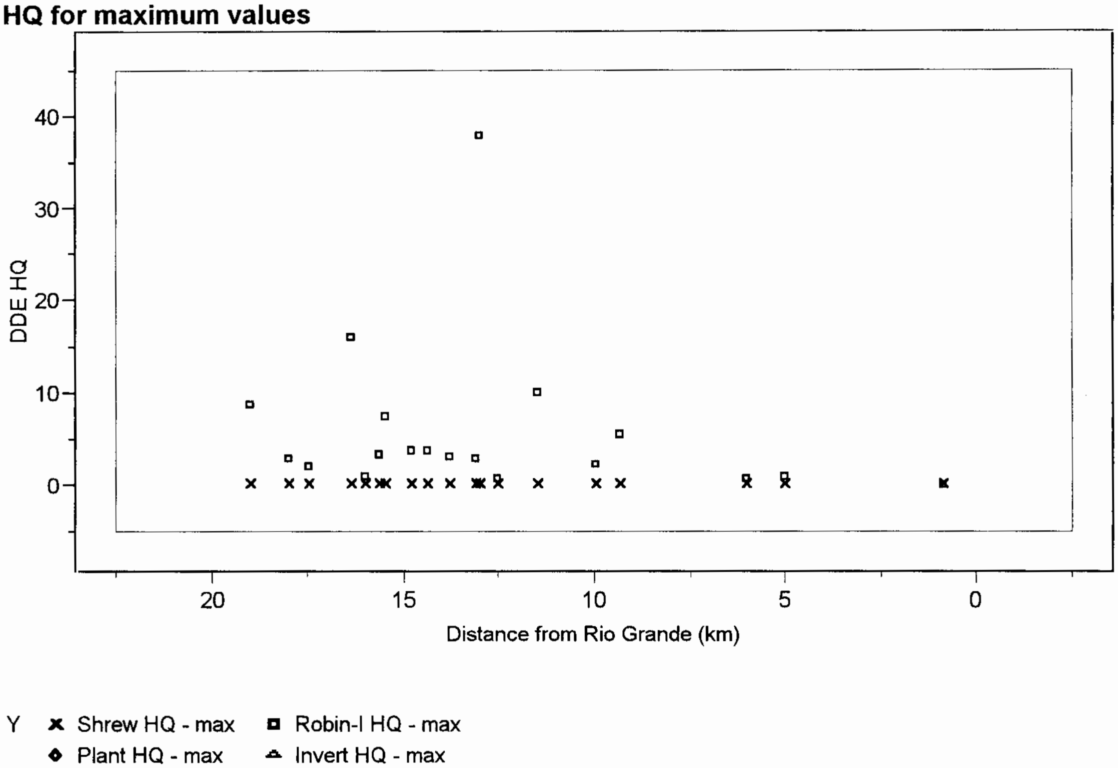
LA/DP Canyons Plot
HQ for mean values



HQ for maximum values



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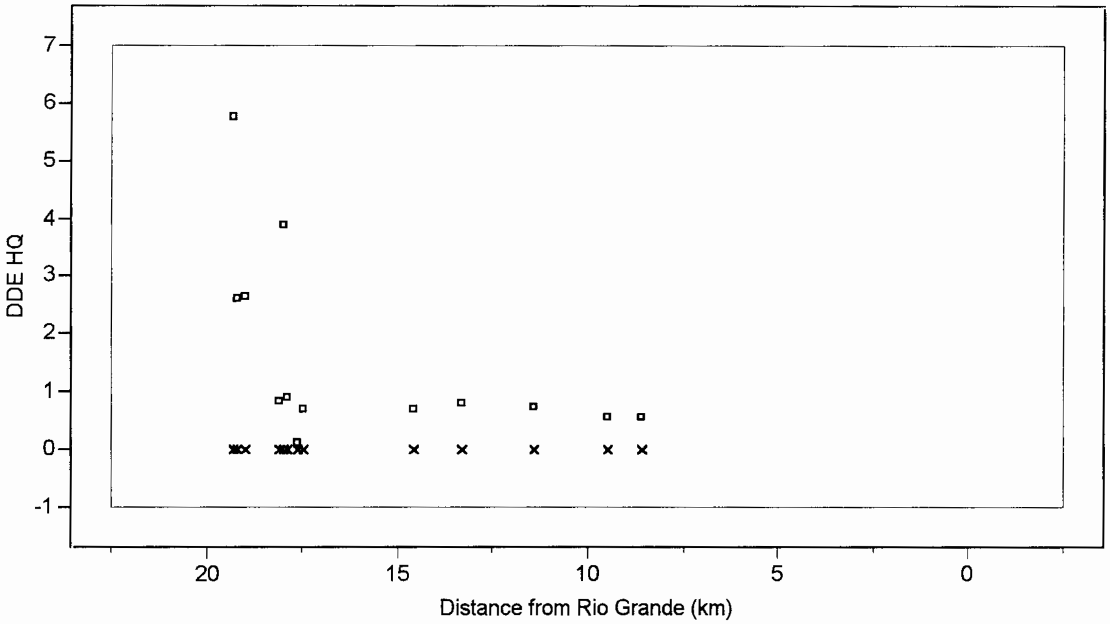
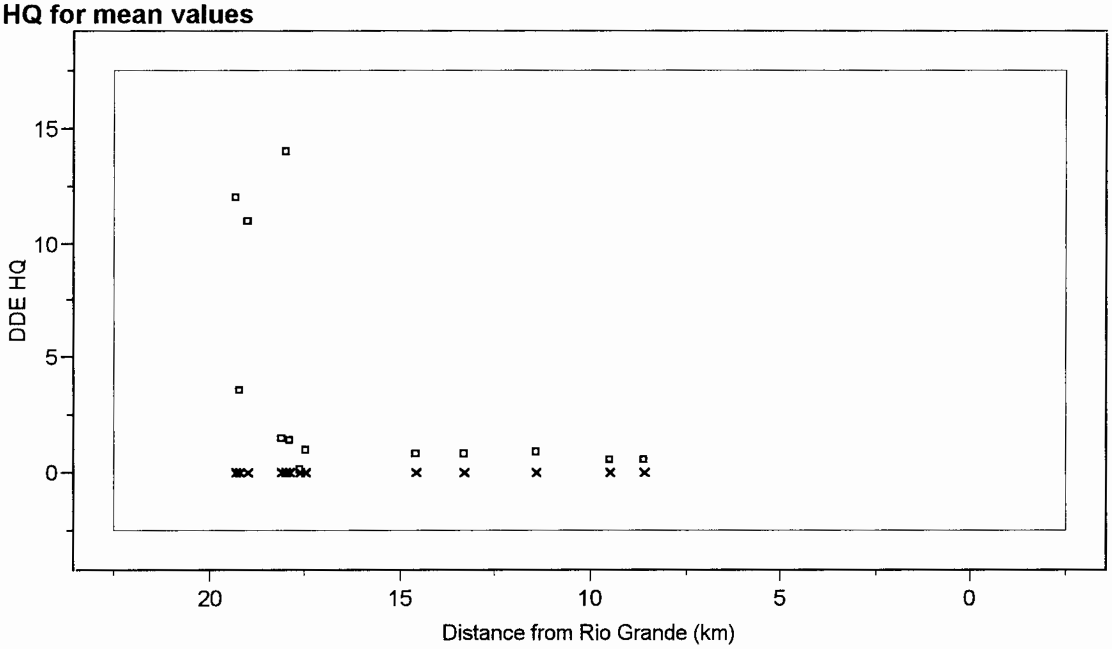
Acid/Pueblo Canyons Plot
HQ for mean values



Y ✖ Shrew HQ - mean ◘ Robin-I HQ - mean
◆ Plant HQ - mean ▲ Invert HQ - mean

HQ for mean values



Y ✖ Shrew HQ - max ◘ Robin-I HQ - max
◆ Plant HQ - max ▲ Invert HQ - max

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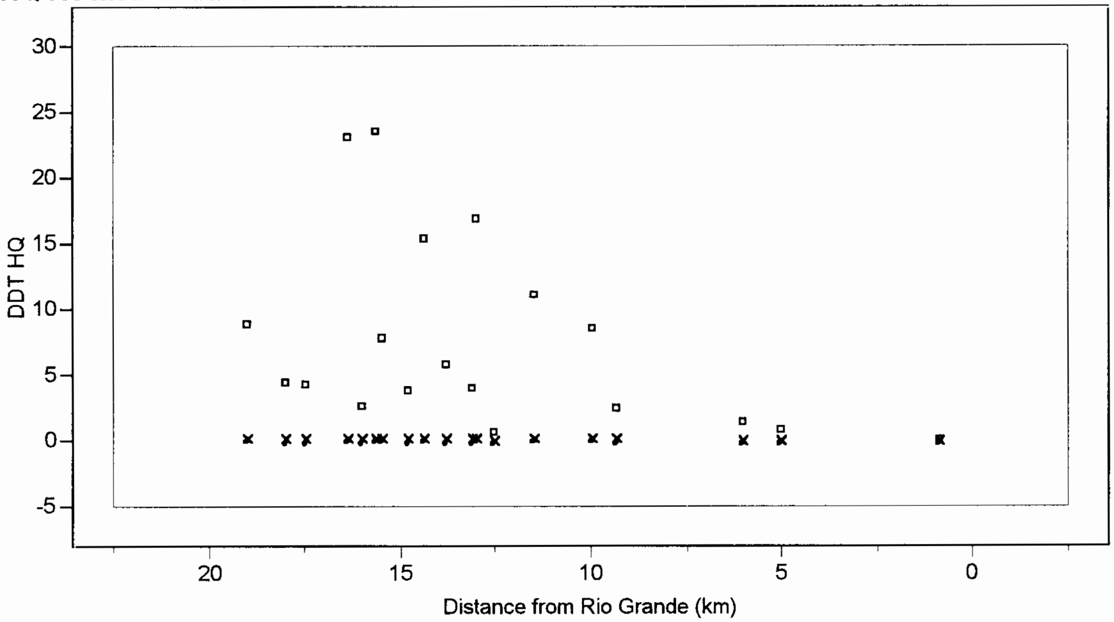
LA/DP Canyons Plot
HQ for mean values



Y ✕ Shrew HQ - mean ◘ Robin-I HQ - mean
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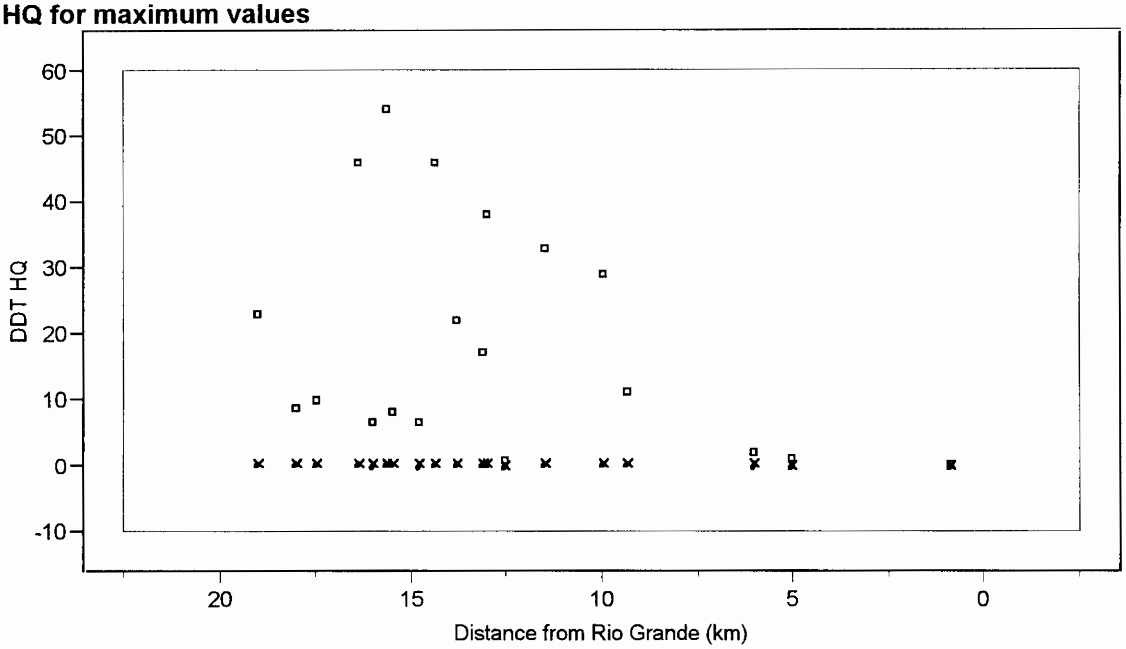
HQ for maximum values



Y ✕ Shrew HQ - max ◘ Robin-I HQ - max
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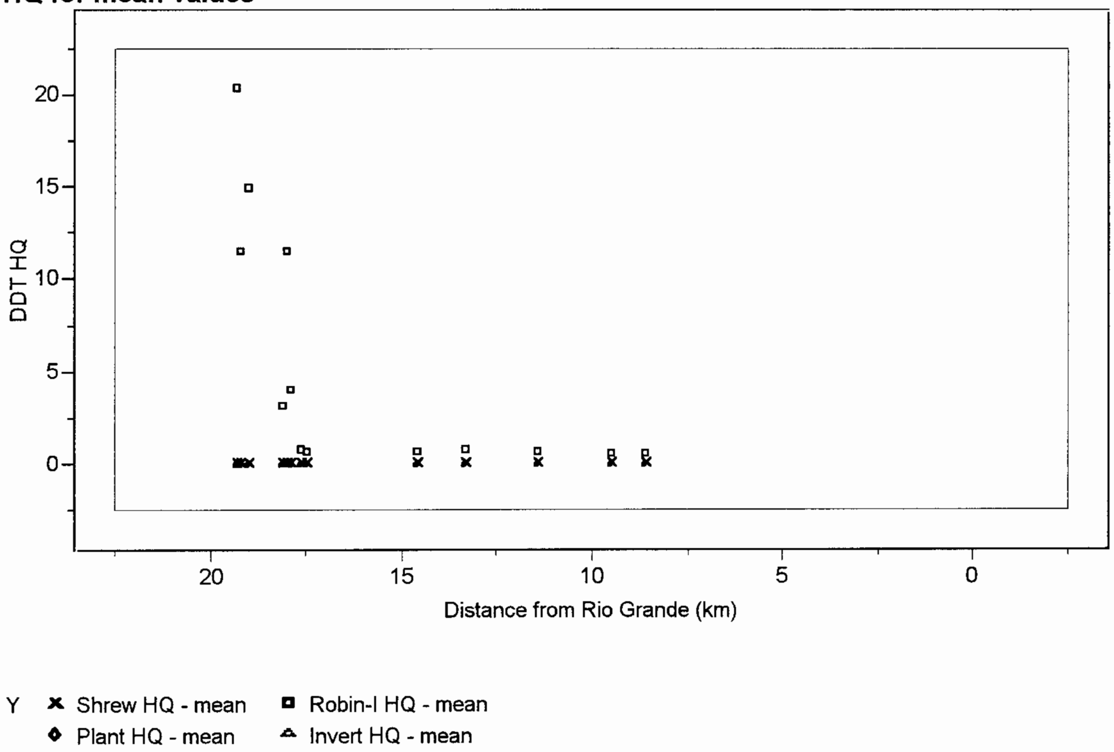
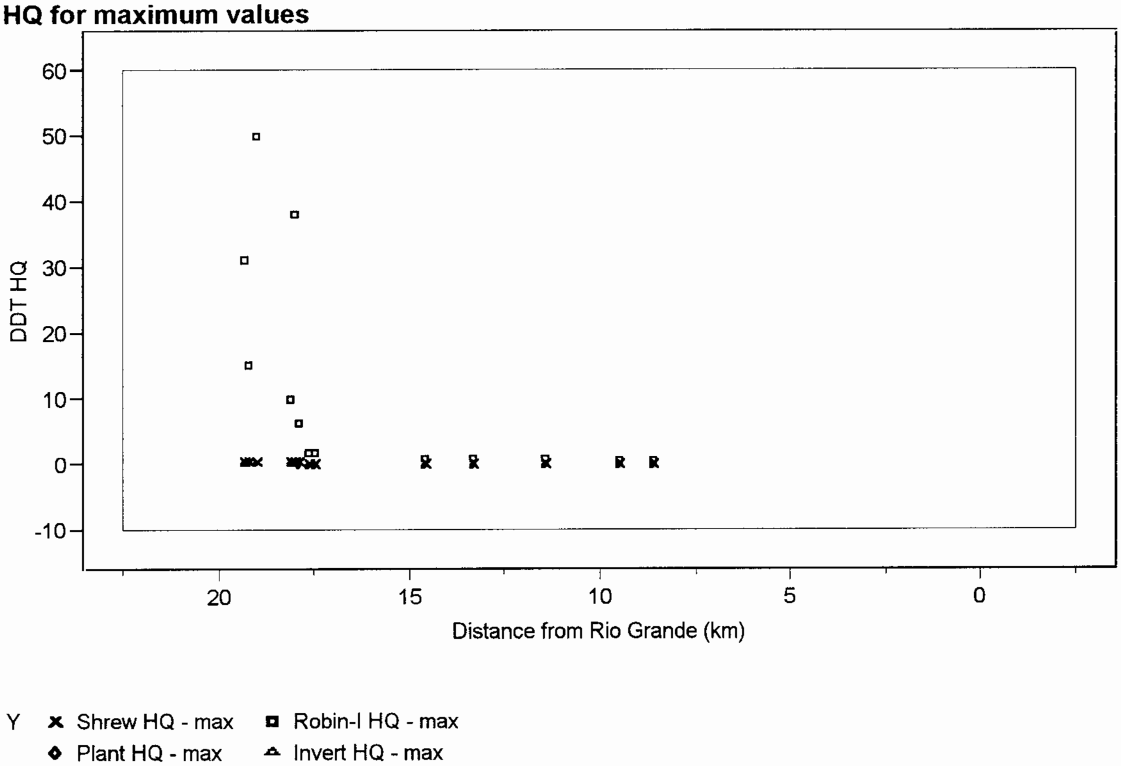
Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

Acid/Pueblo Canyons Plot
HQ for mean values



HQ for maximum values



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LA/DP Canyons Plot
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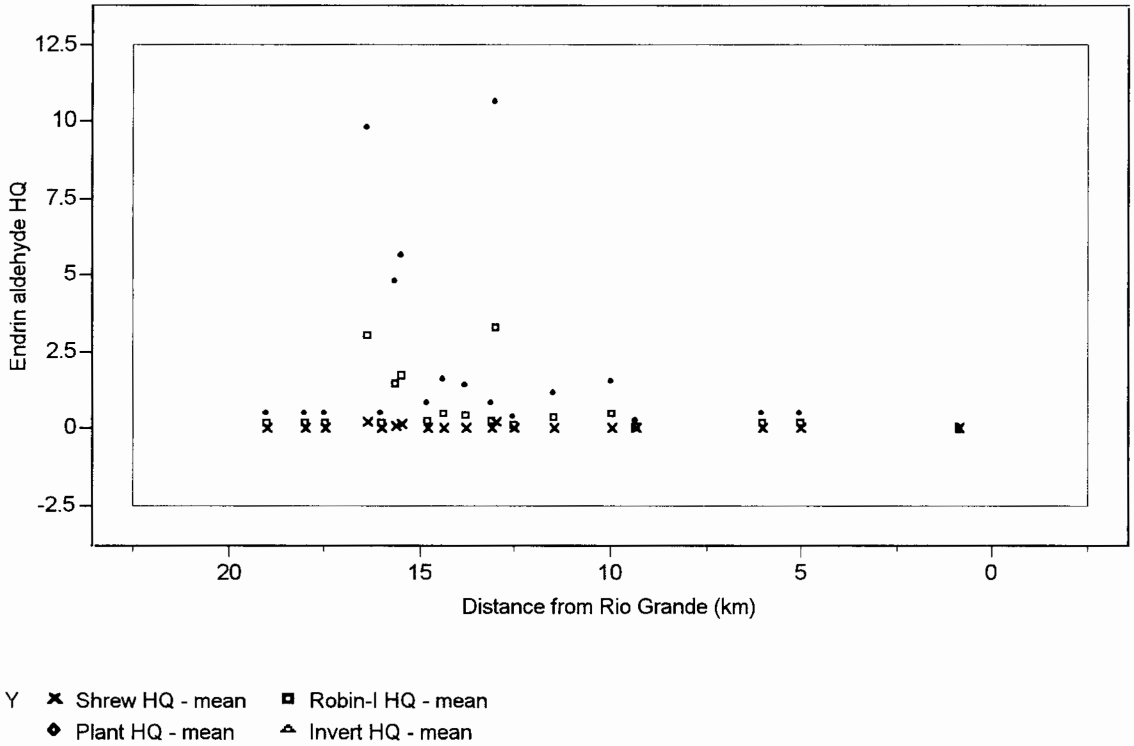
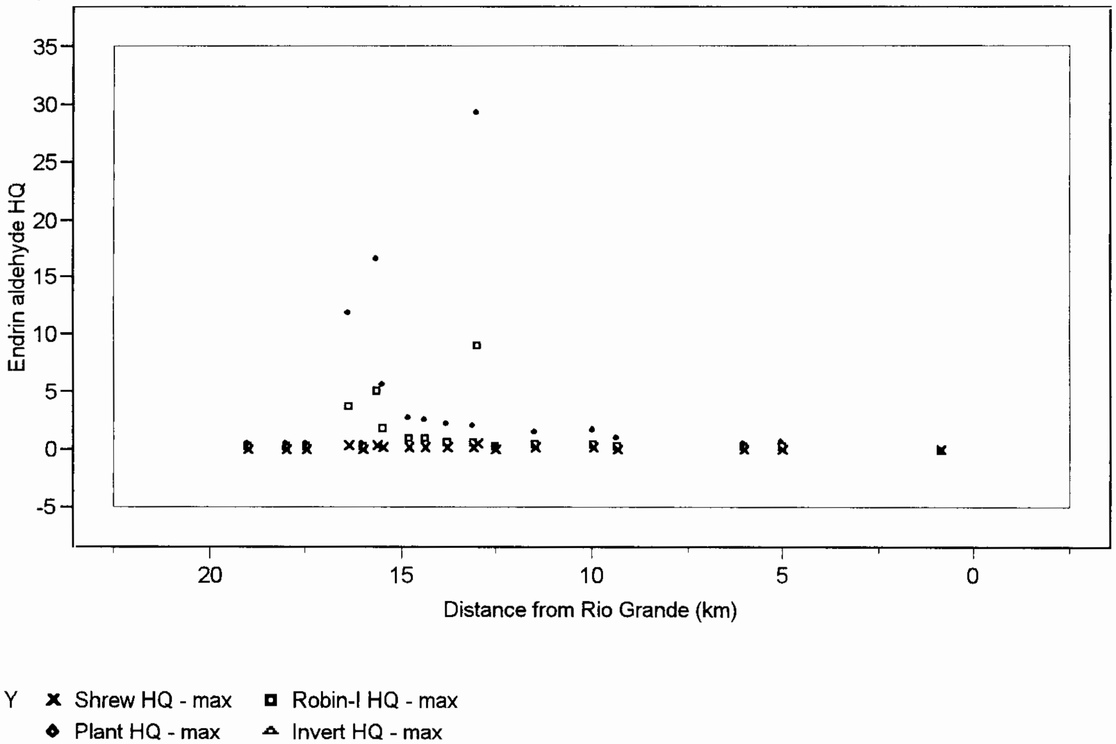


HQ for maximum values



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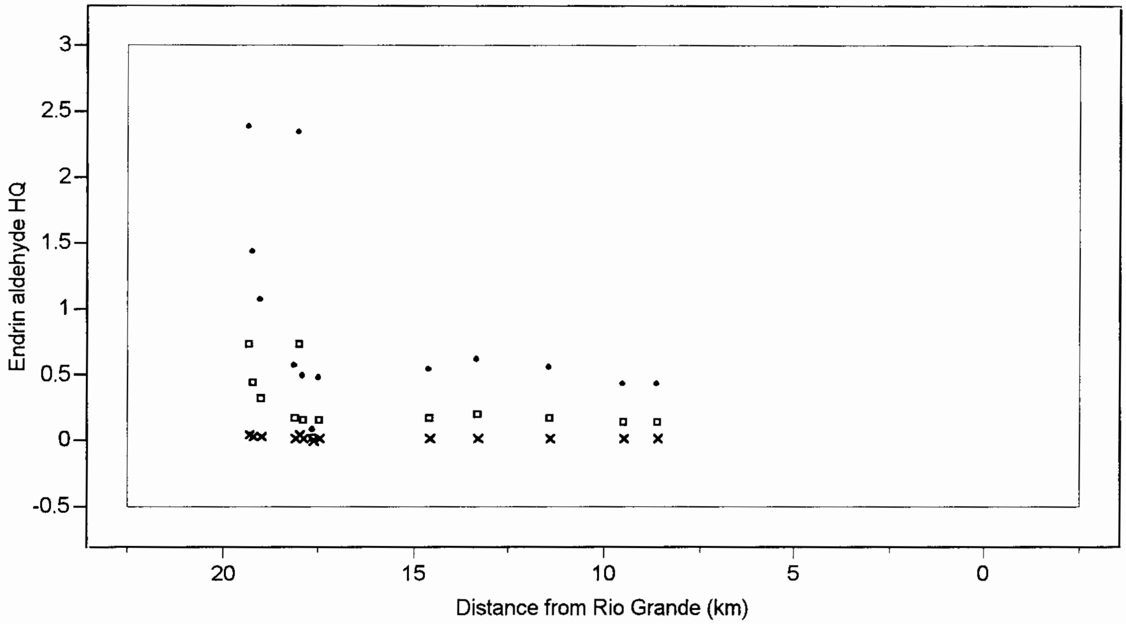
Acid/Pueblo Canyons Plot
HQ for mean values



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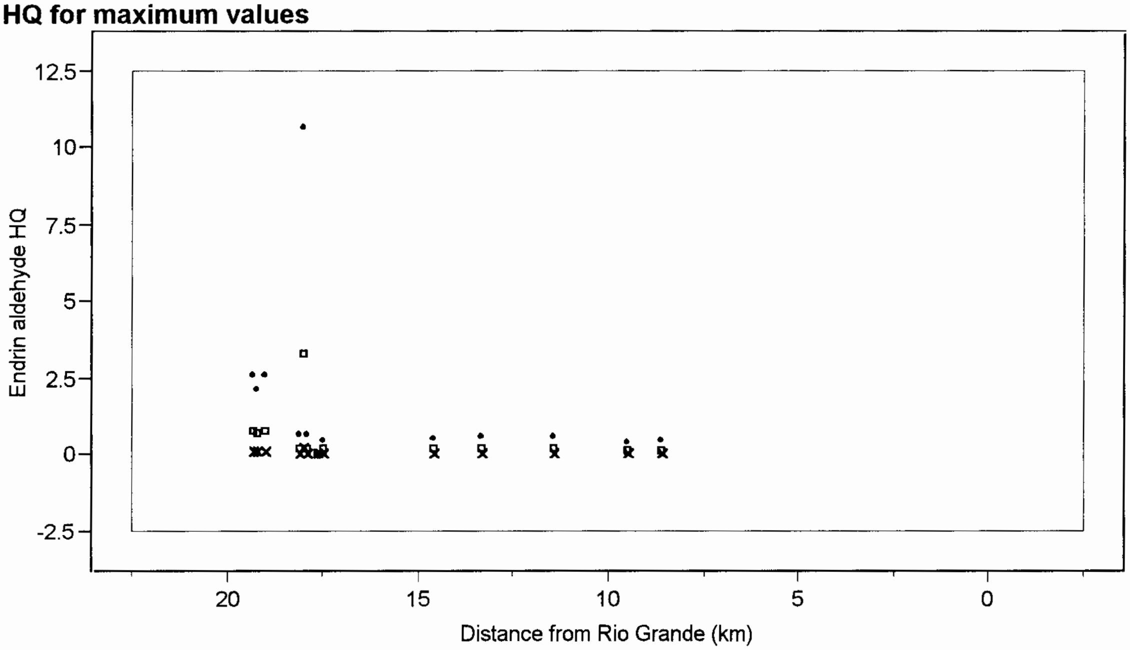

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LA/DP Canyons Plot
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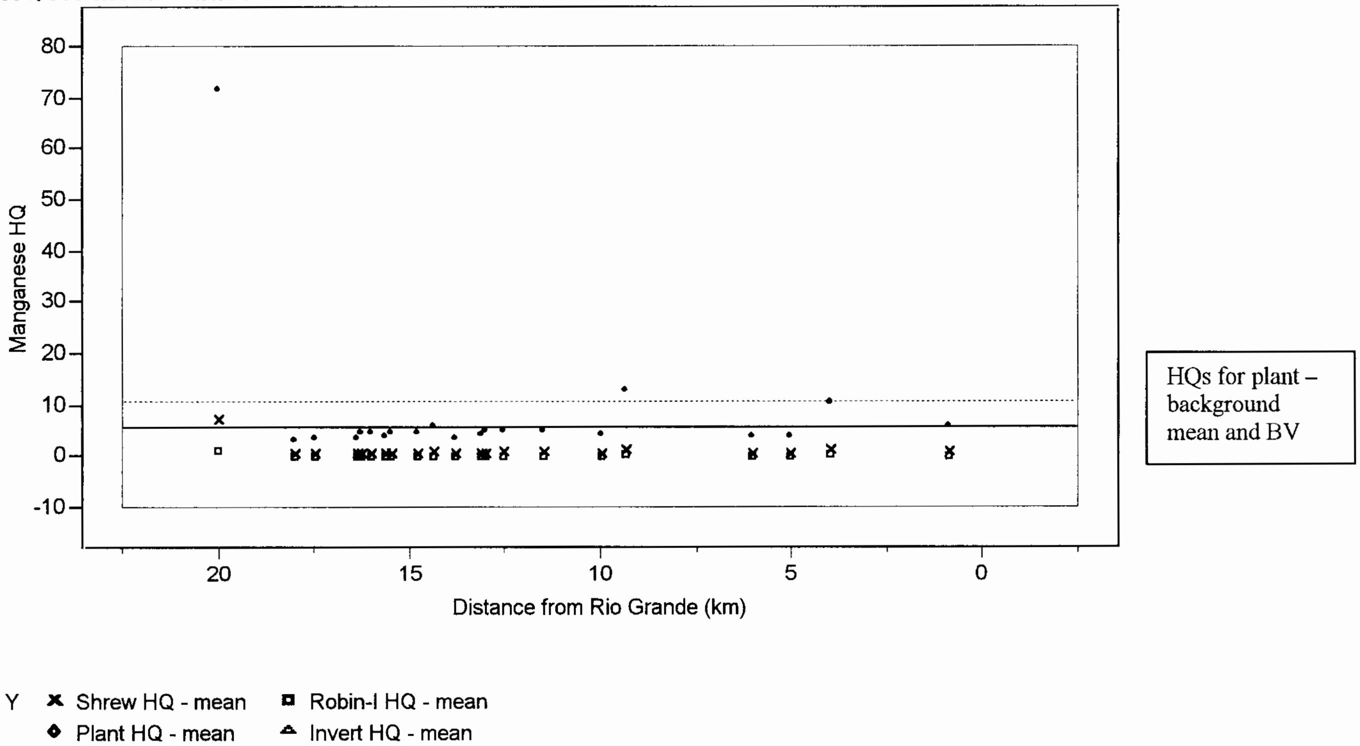
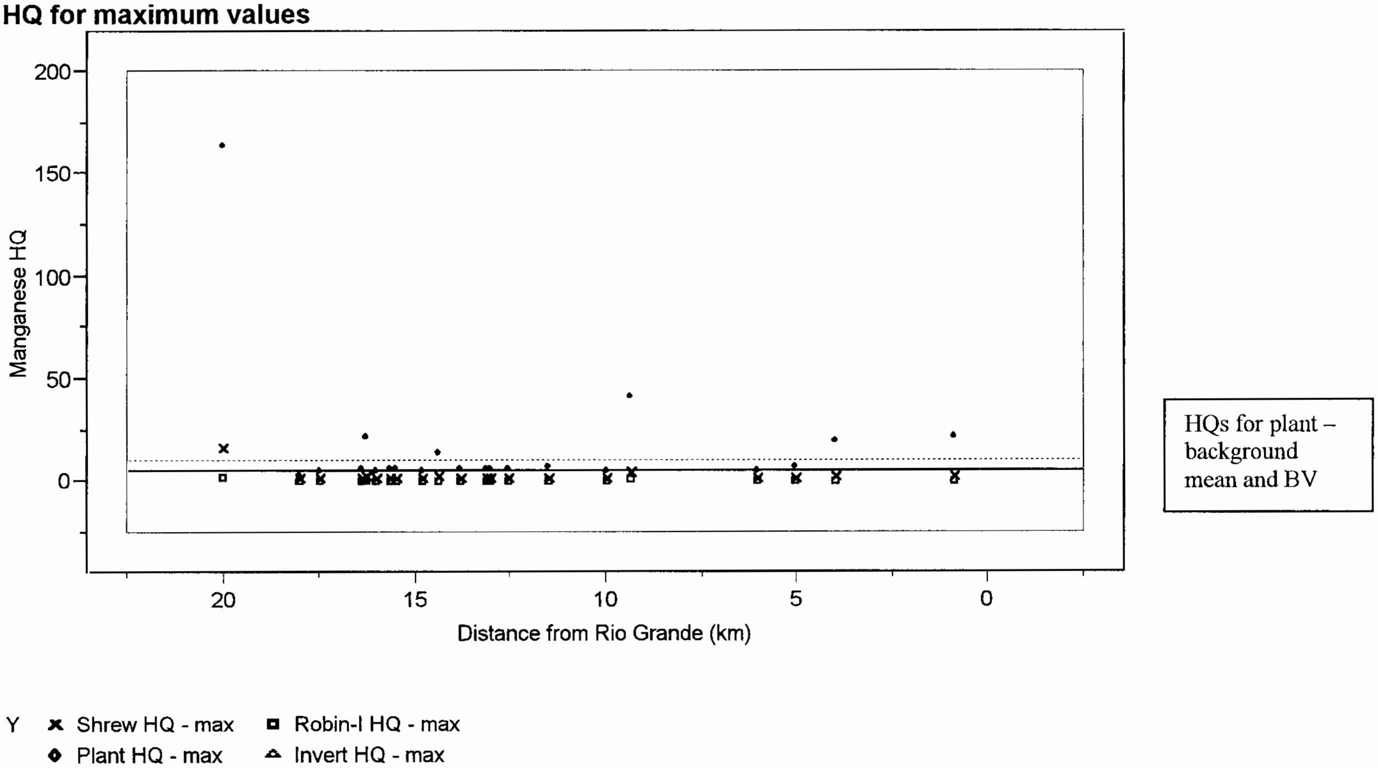


HQ for maximum values



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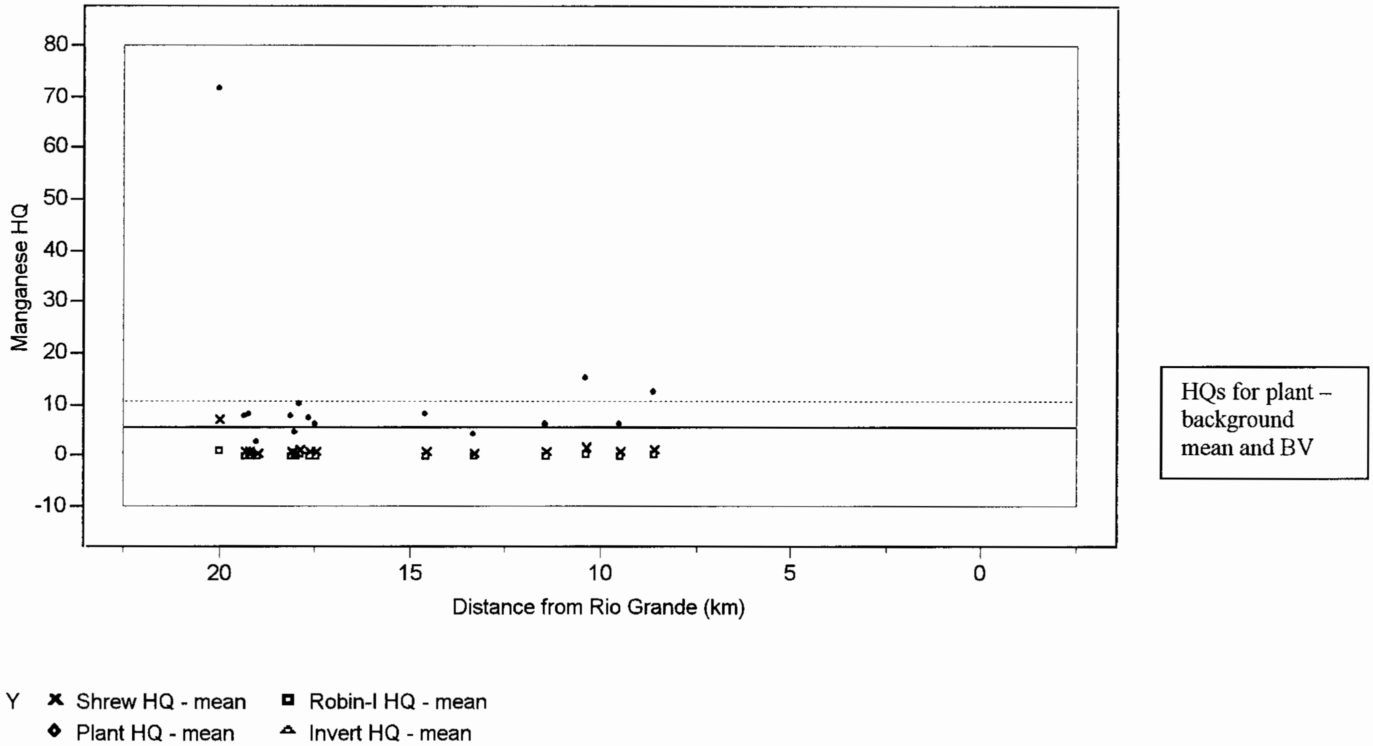
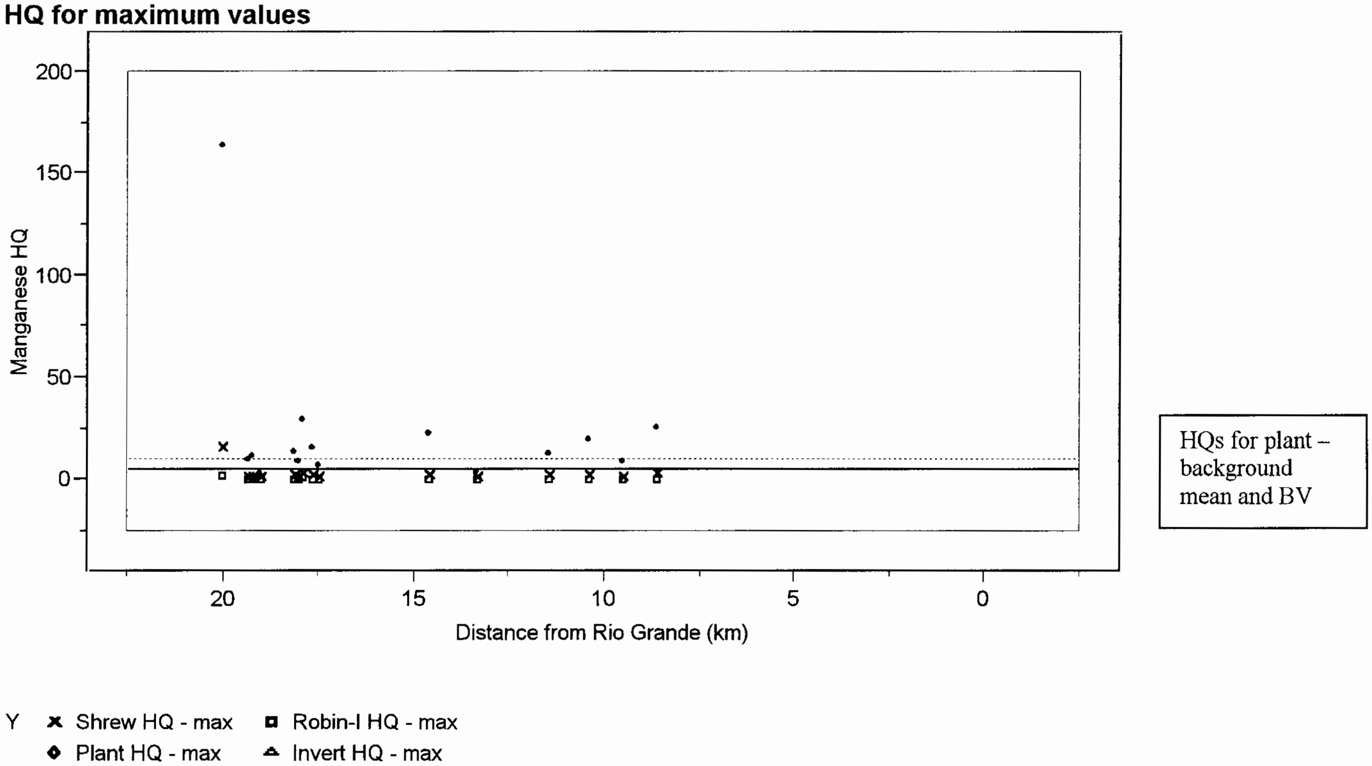
Acid/Pueblo Canyons Plot
HQ for mean values



HQ for maximum values



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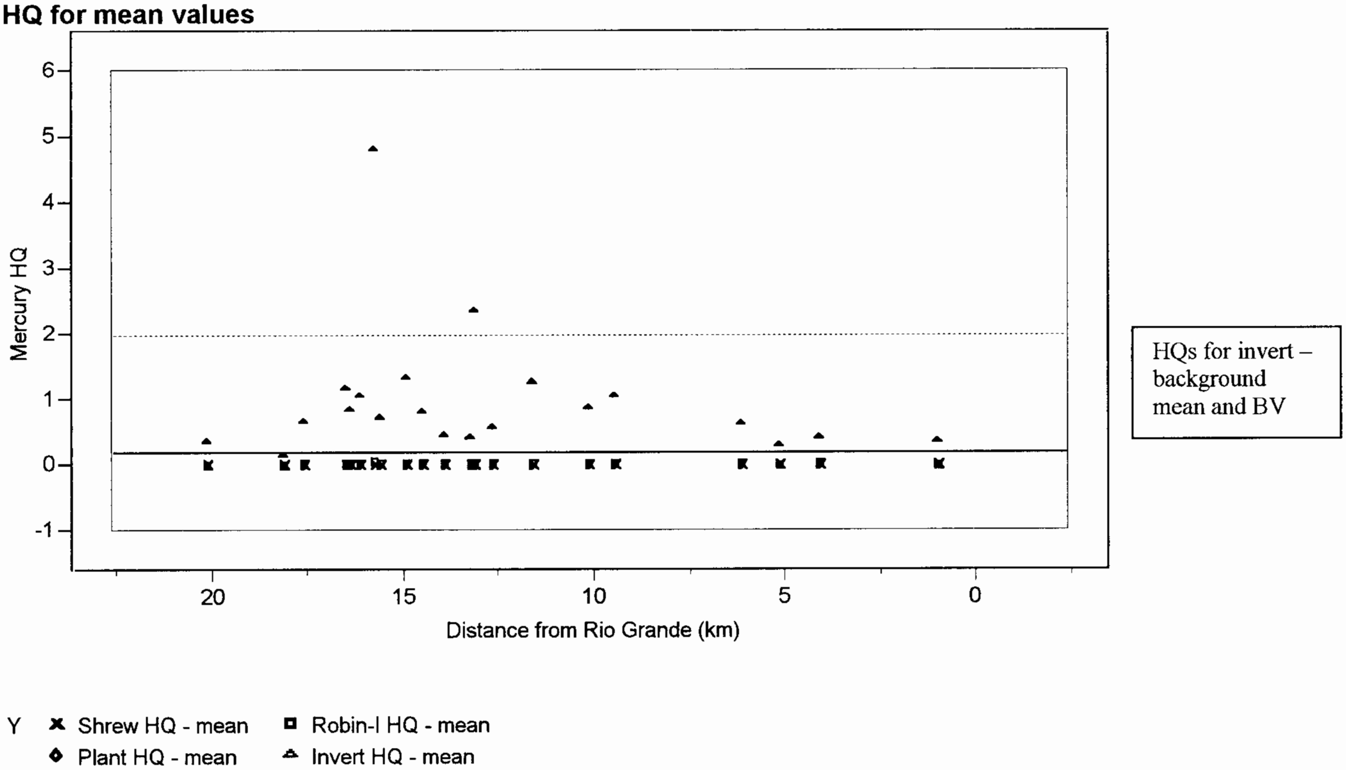

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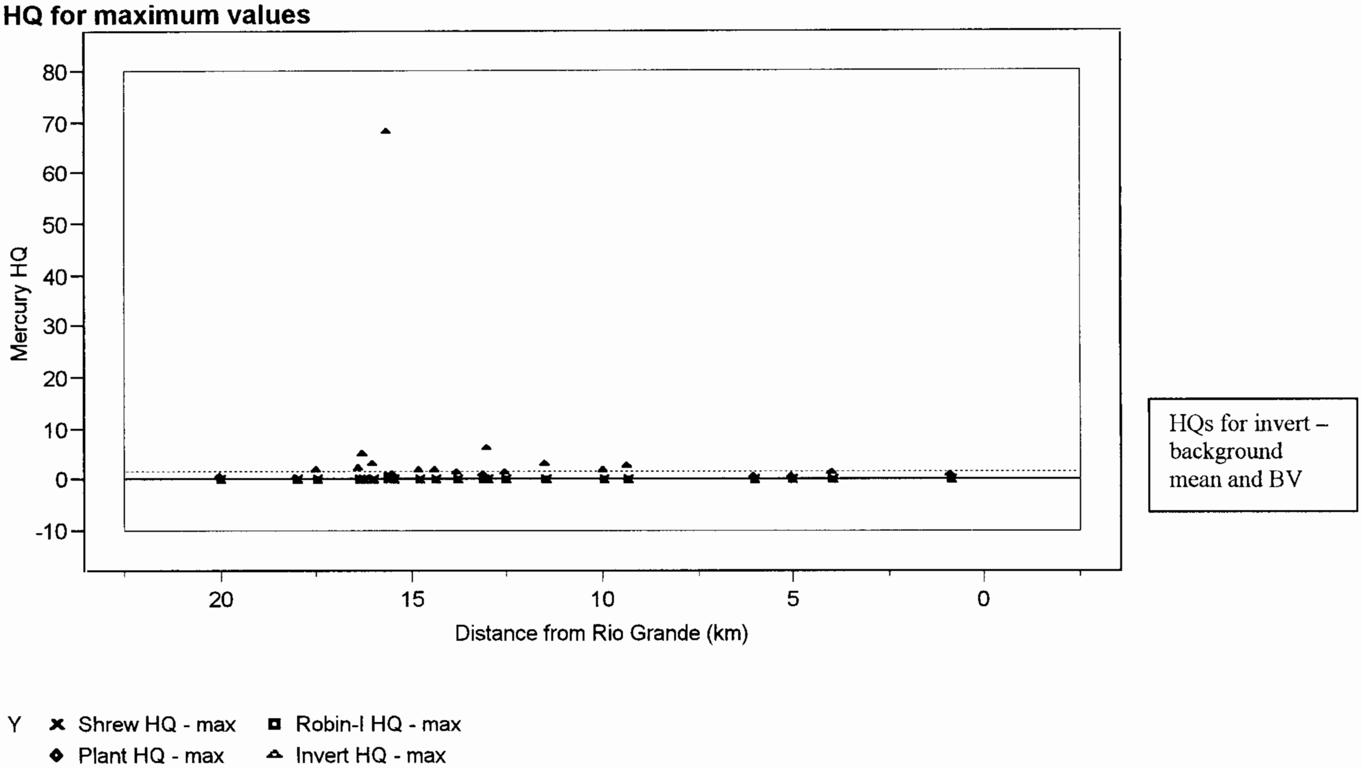

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Acid/Pueblo Canyons Plot
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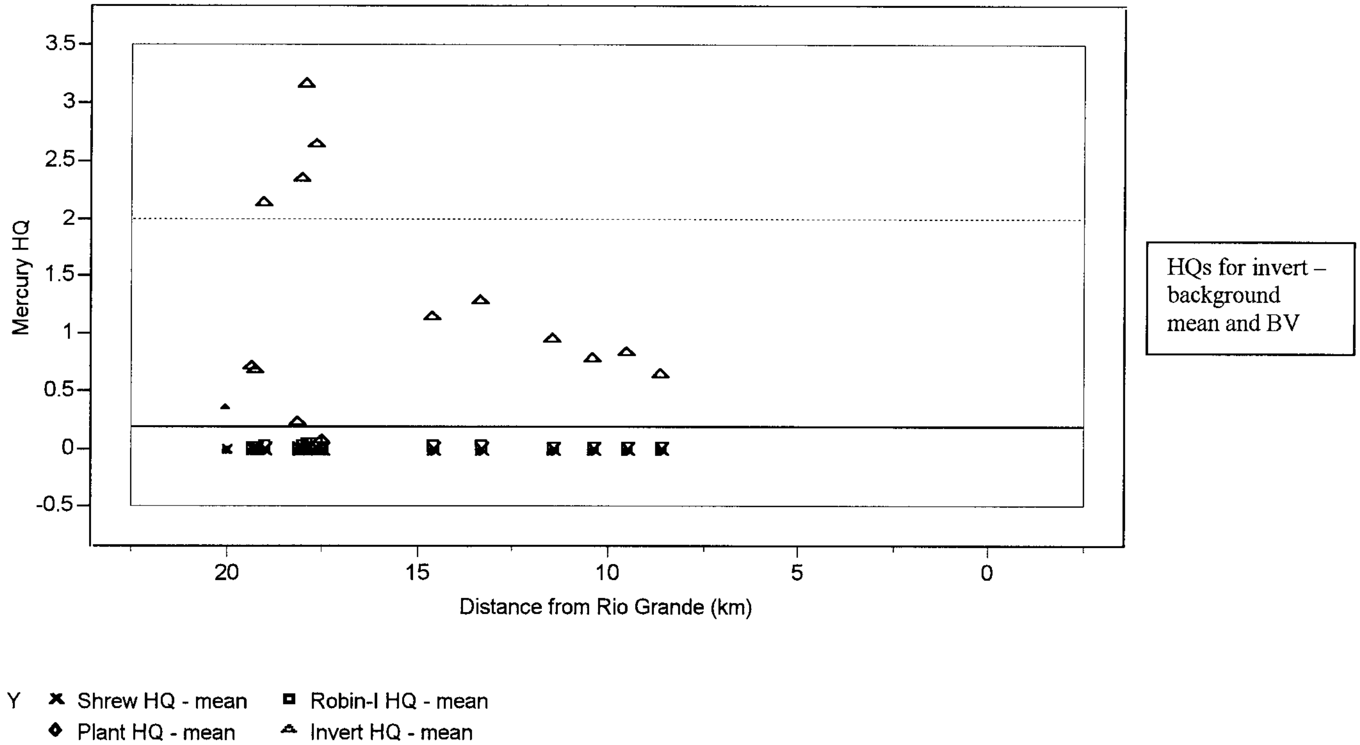

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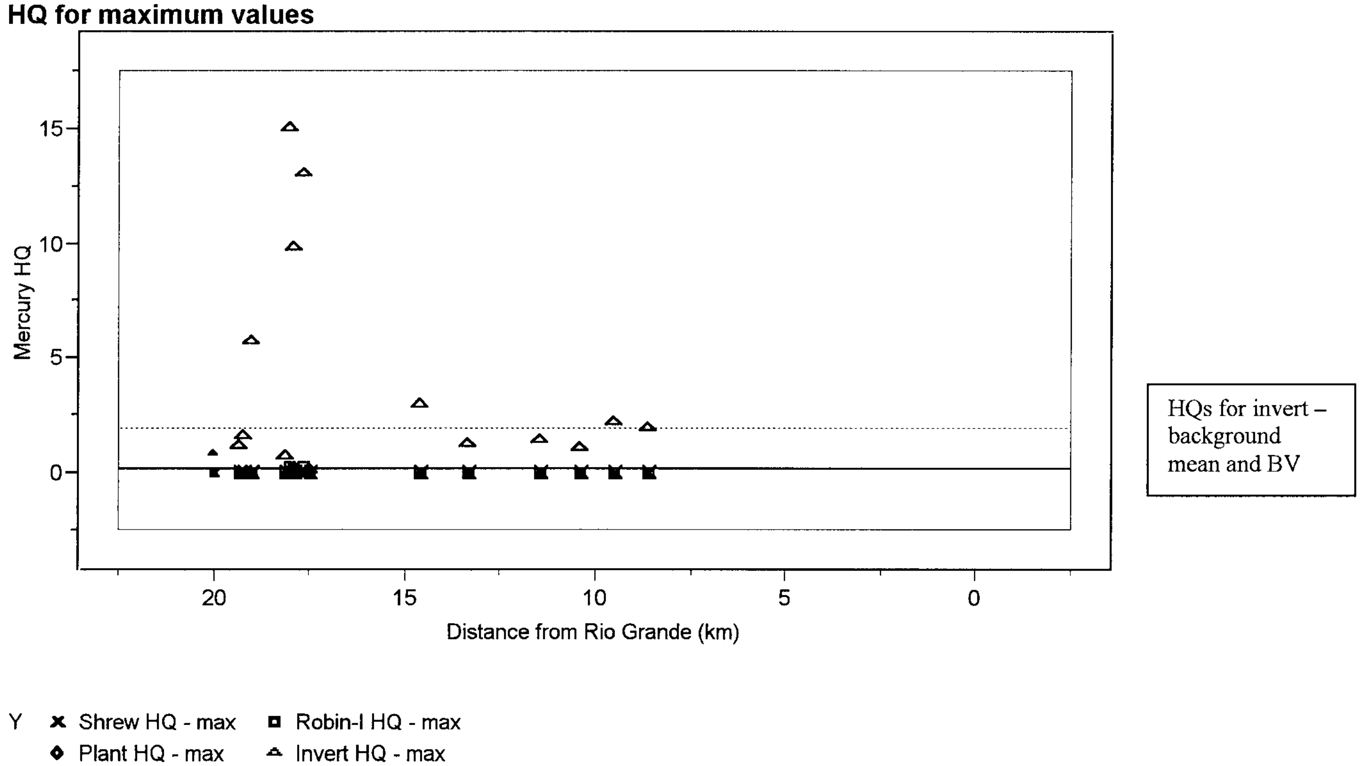

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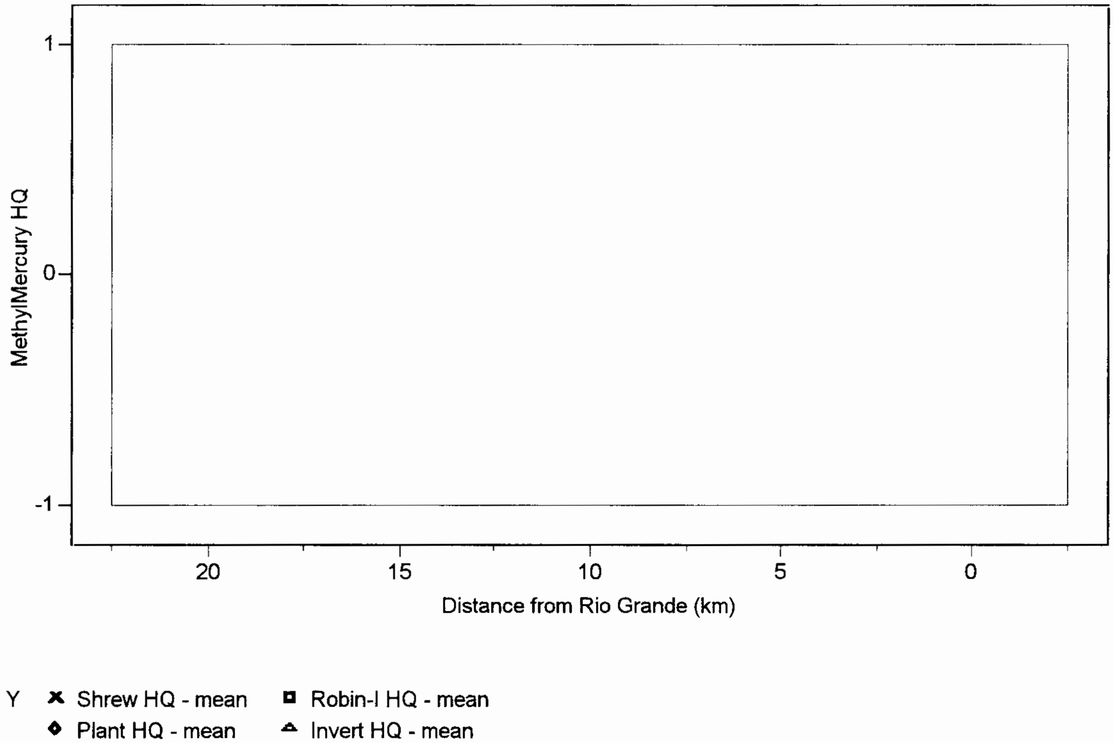
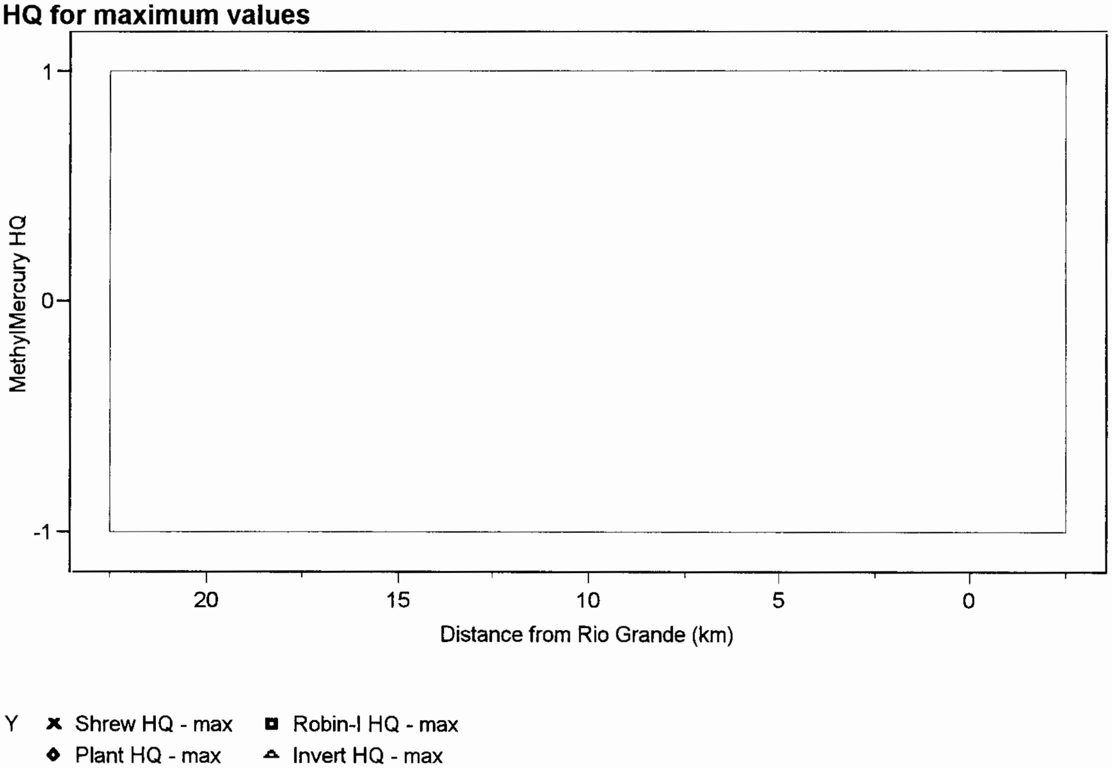
LA/DP Canyons Plot
HQ for mean values



HQ for maximum values



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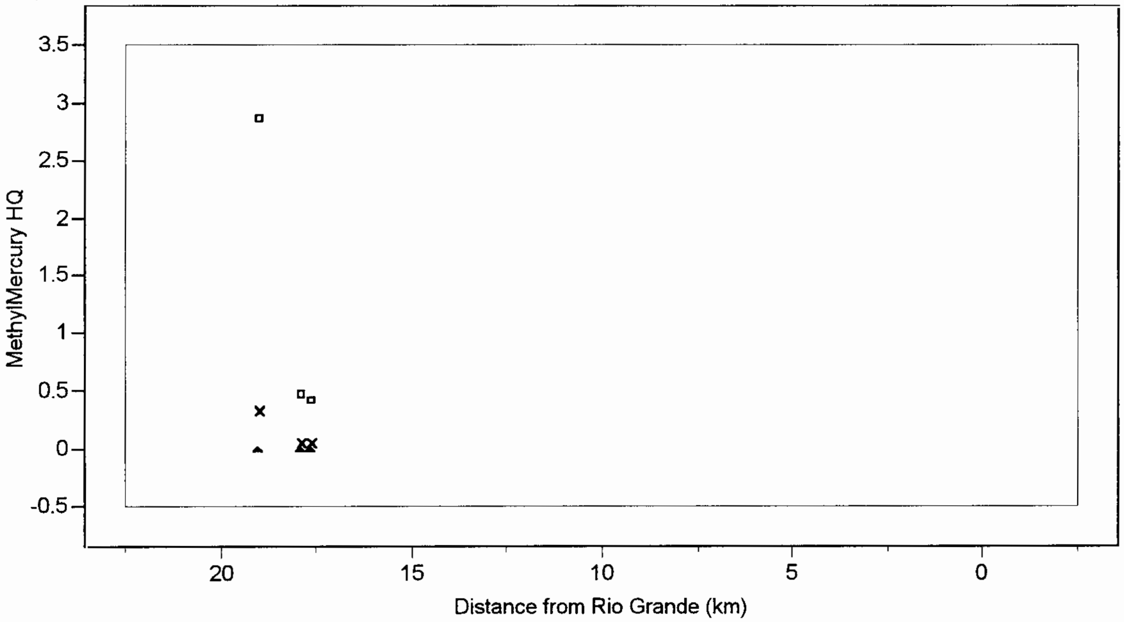
Acid/Pueblo Canyons Plot
HQ for mean values



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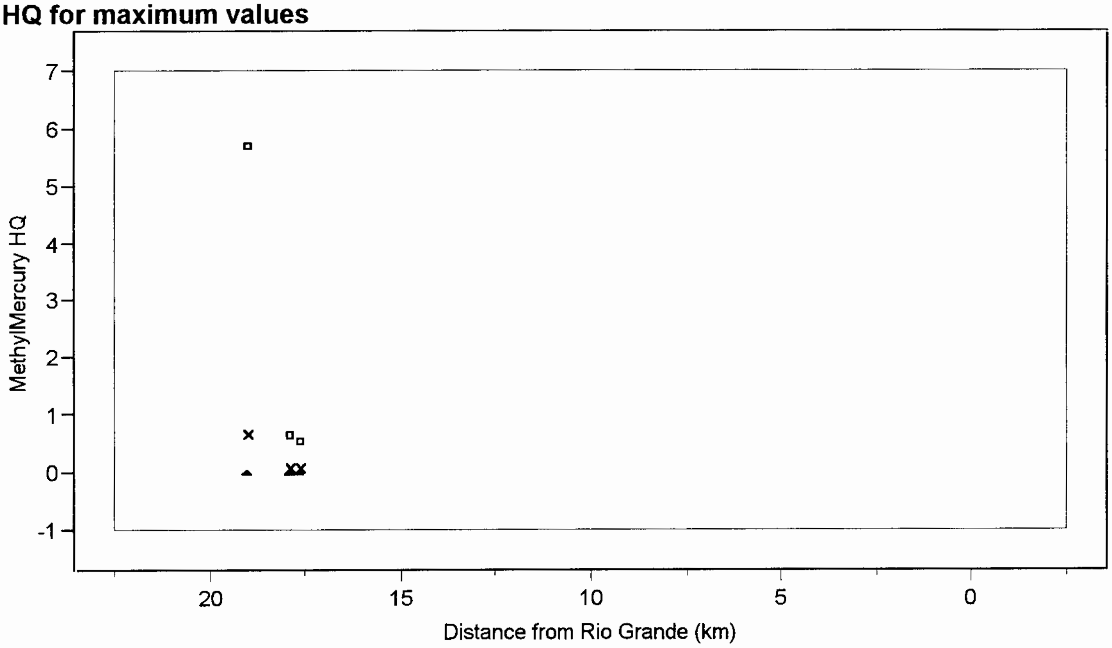
HQ for maximum values

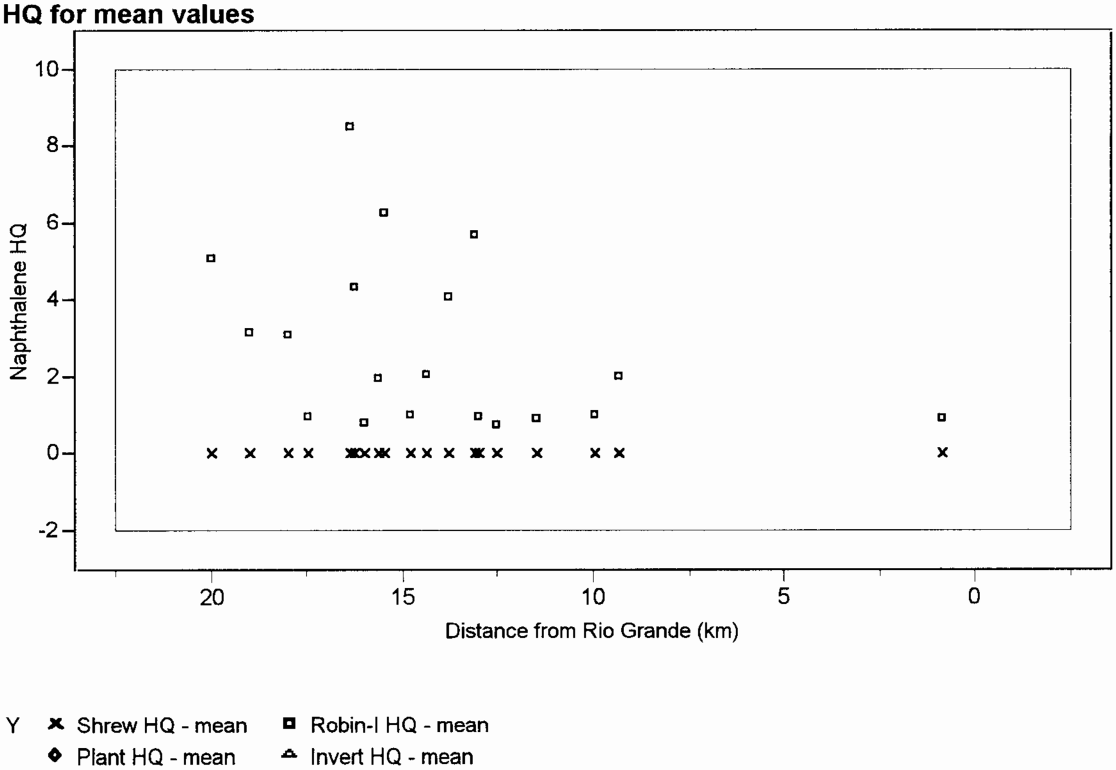


Y ✕ Shrew HQ - max ◻ Robin-I HQ - max
◆ Plant HQ - max ▲ Invert HQ - max

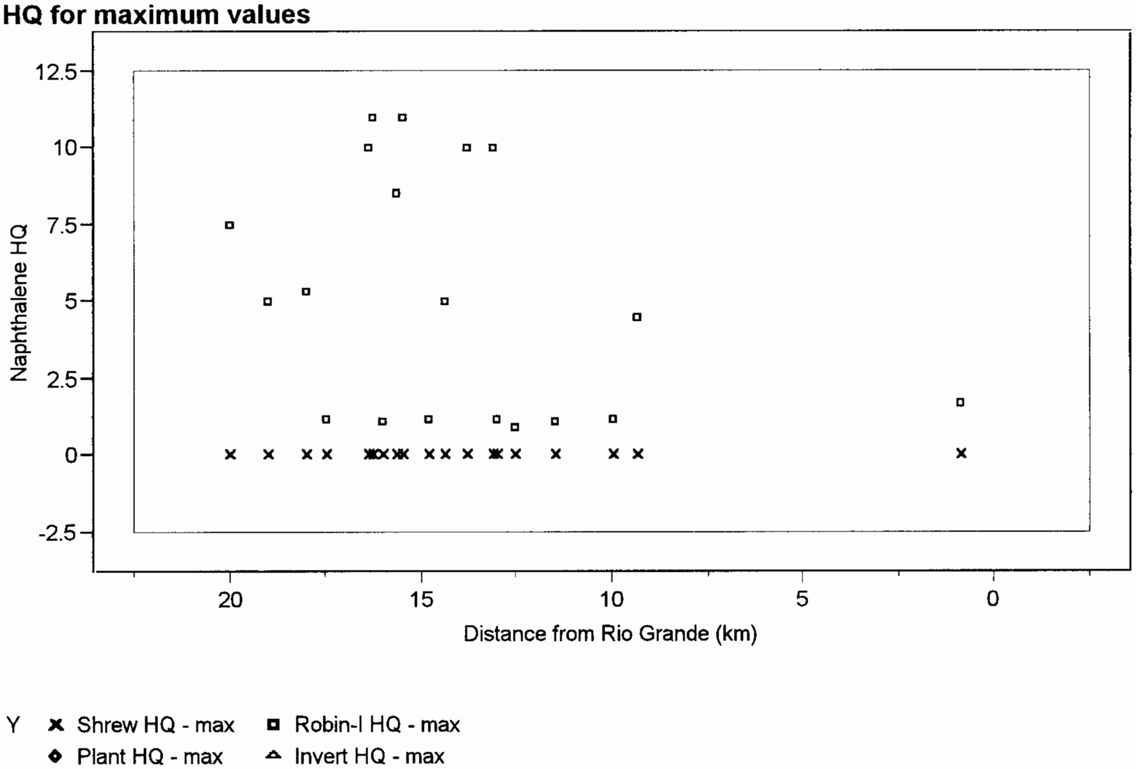
Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

LA/DP Canyons Plot

HQ for mean values



HQ for maximum values



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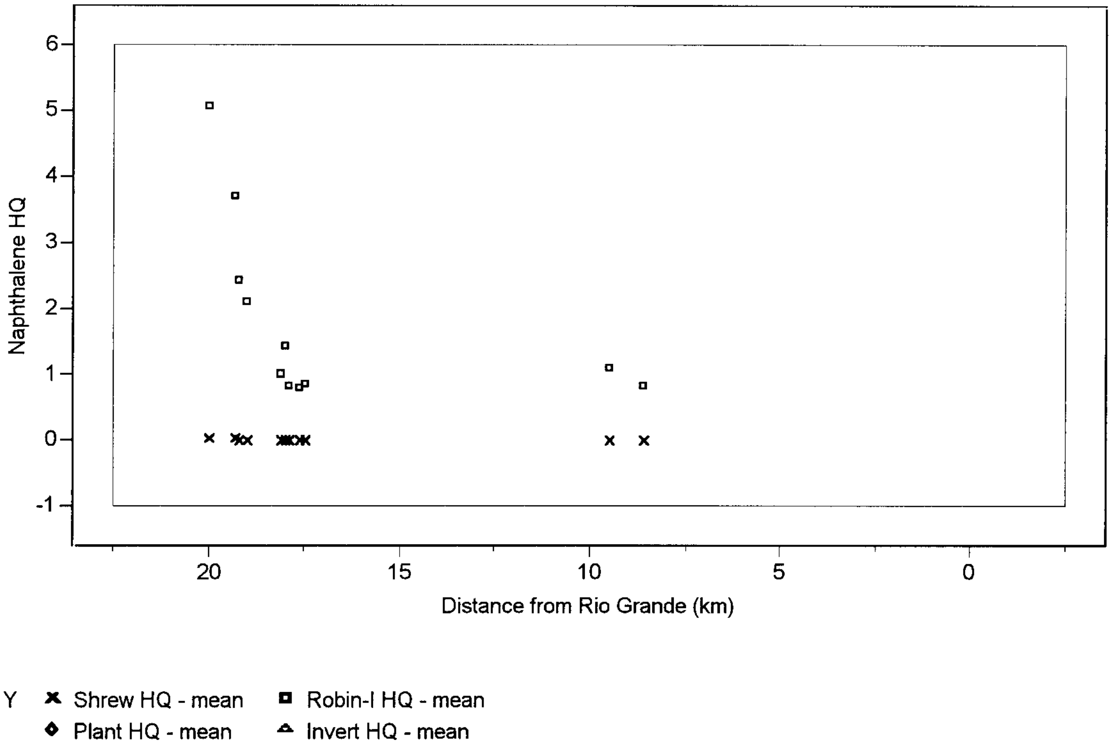
Acid/Pueblo Canyons Plot
HQ for mean values



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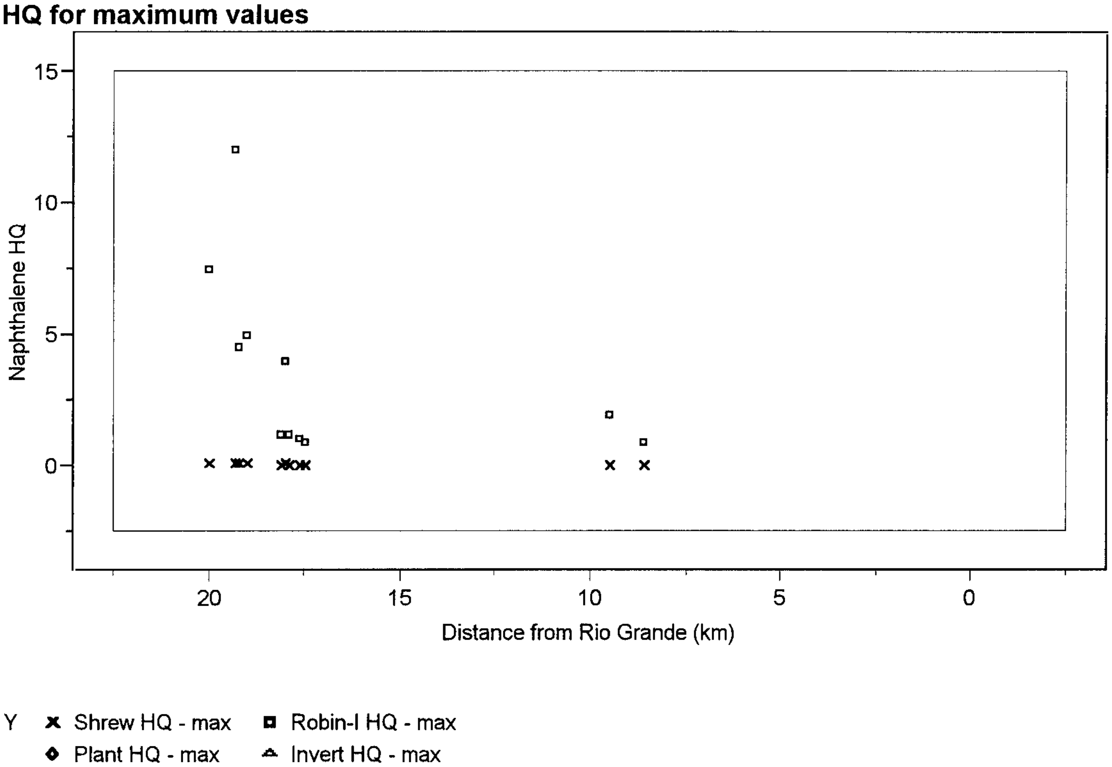

LA/DP Canyons Plot
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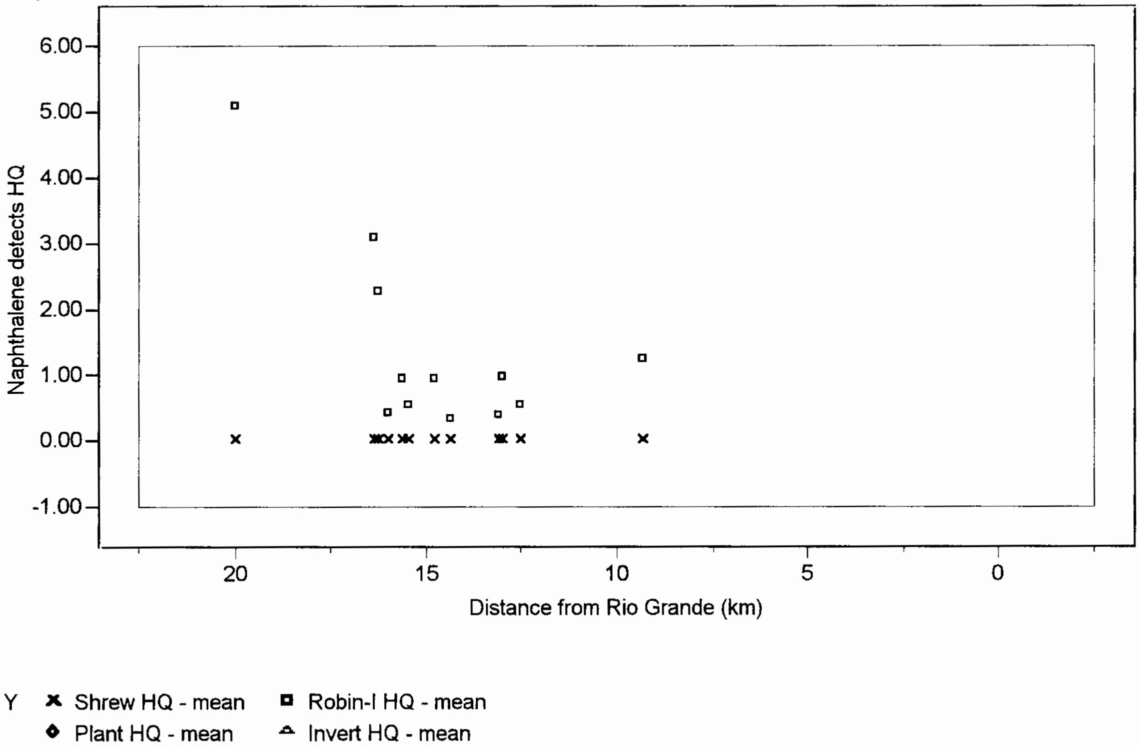

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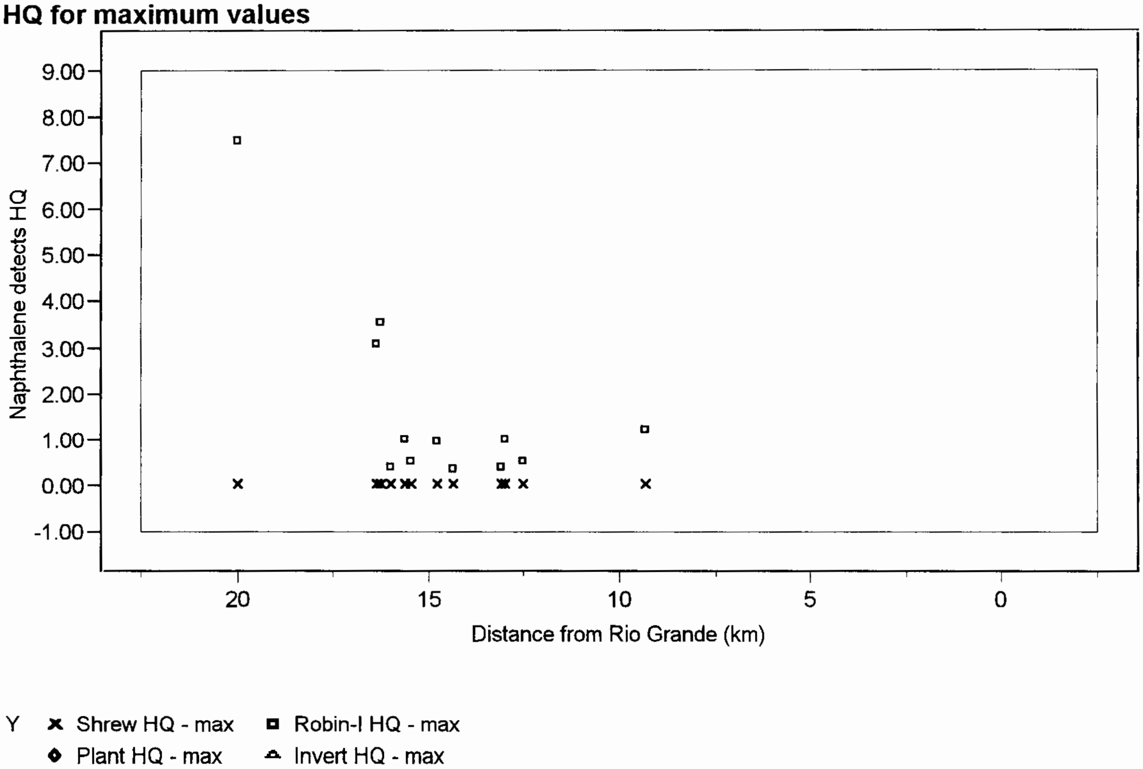
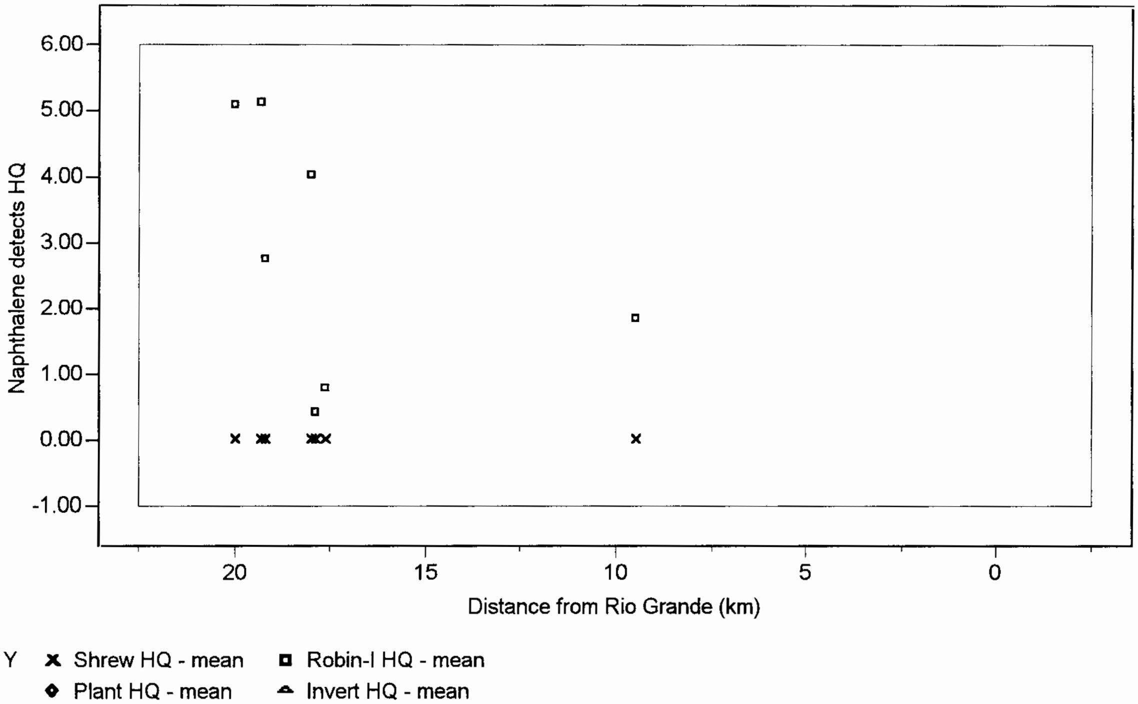
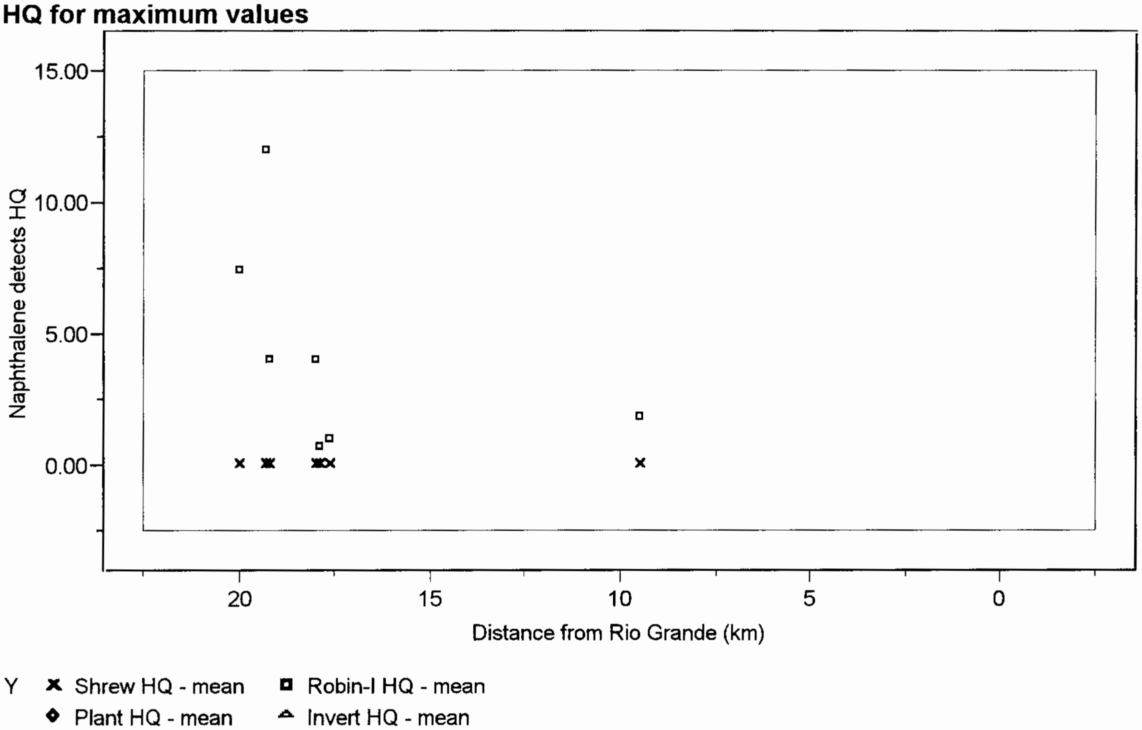


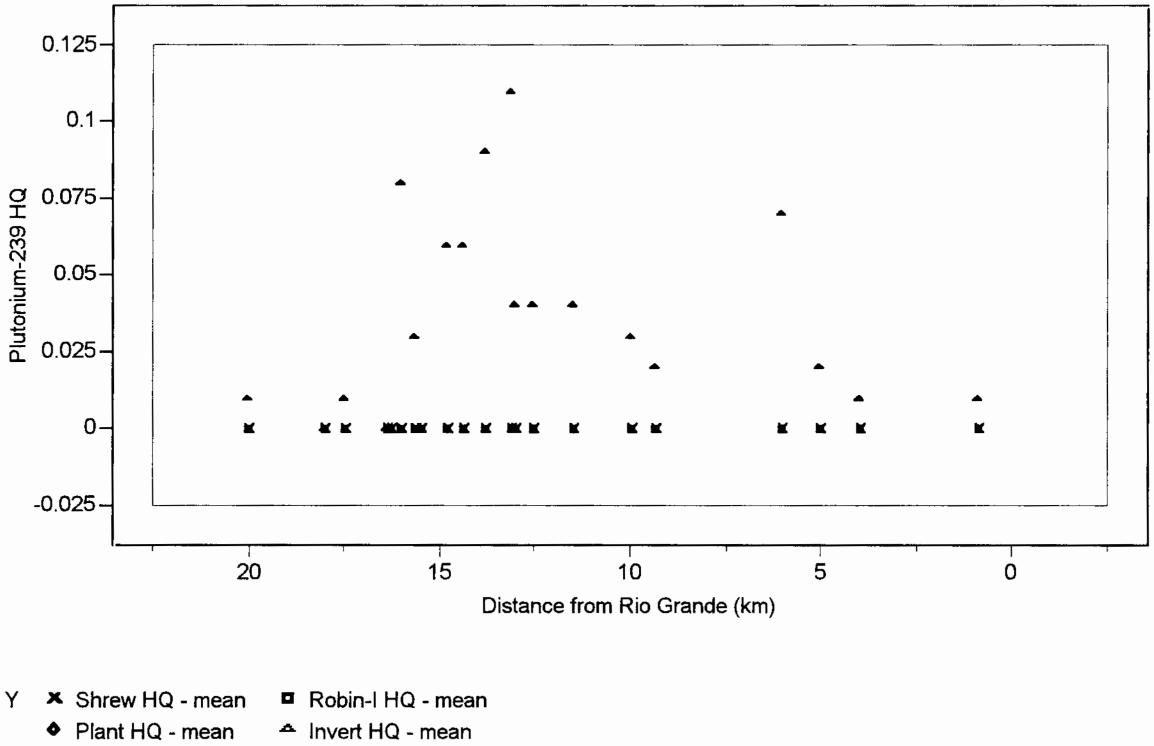
Acid/Pueblo Canyons Plot
HQ for mean values



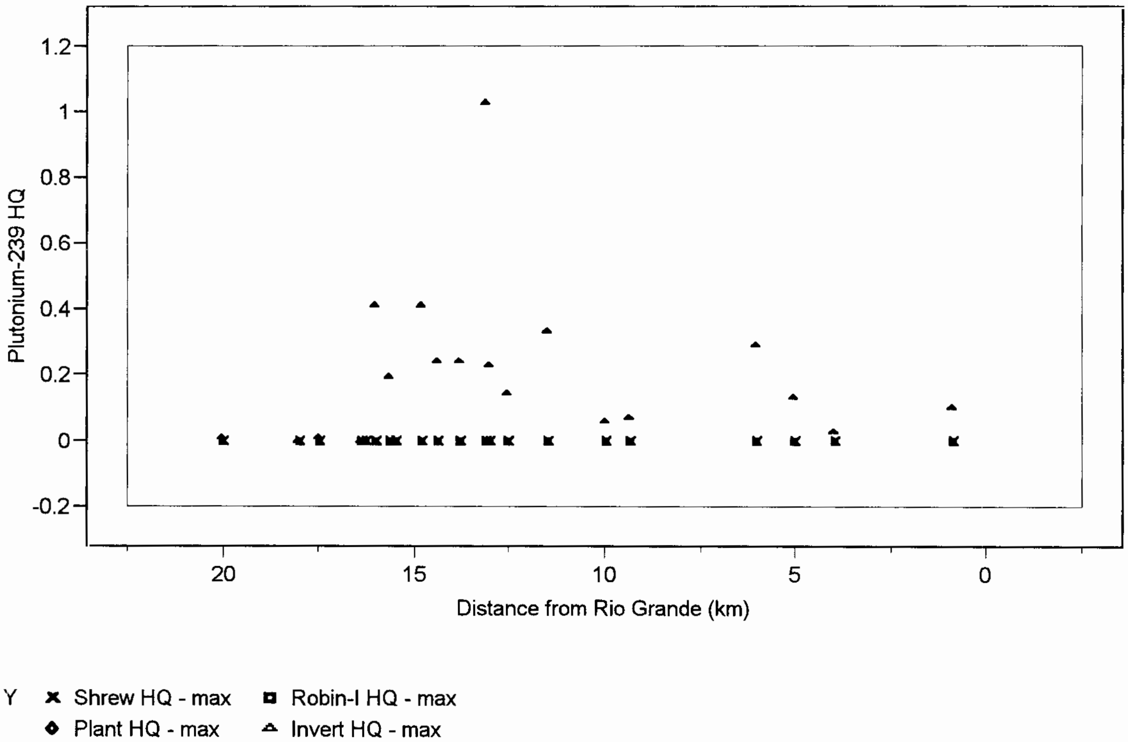
HQ for maximum values



LA/DP Canyons Plot
HQ for mean values



HQ for maximum values



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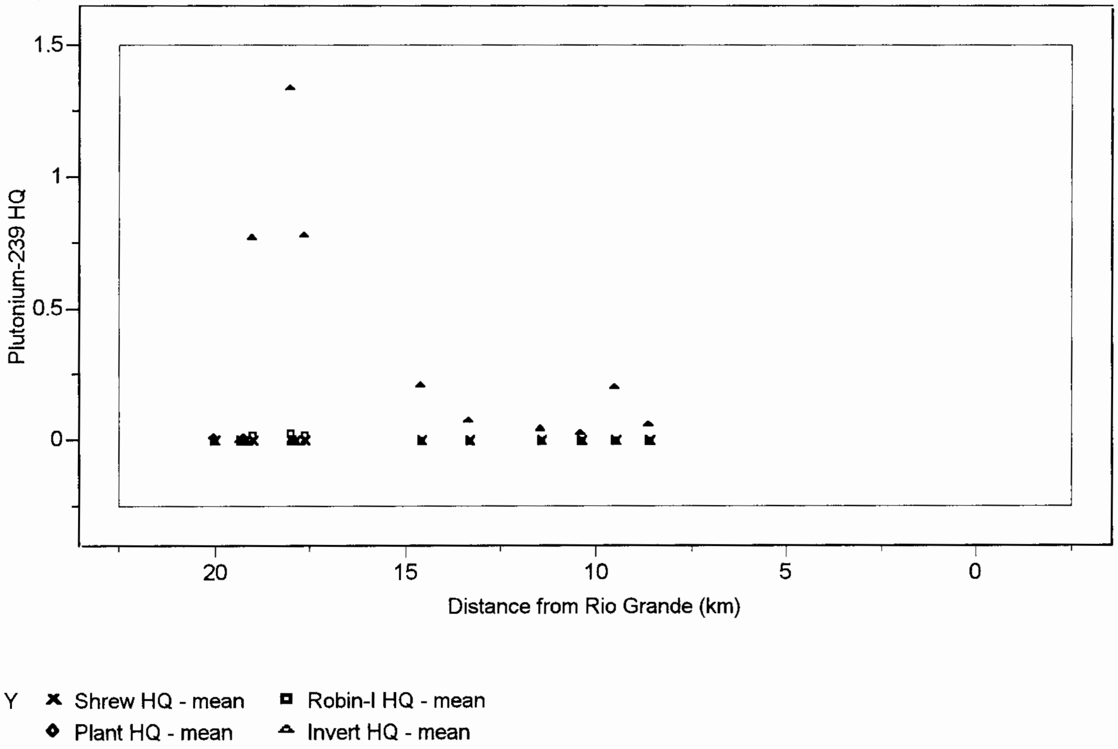
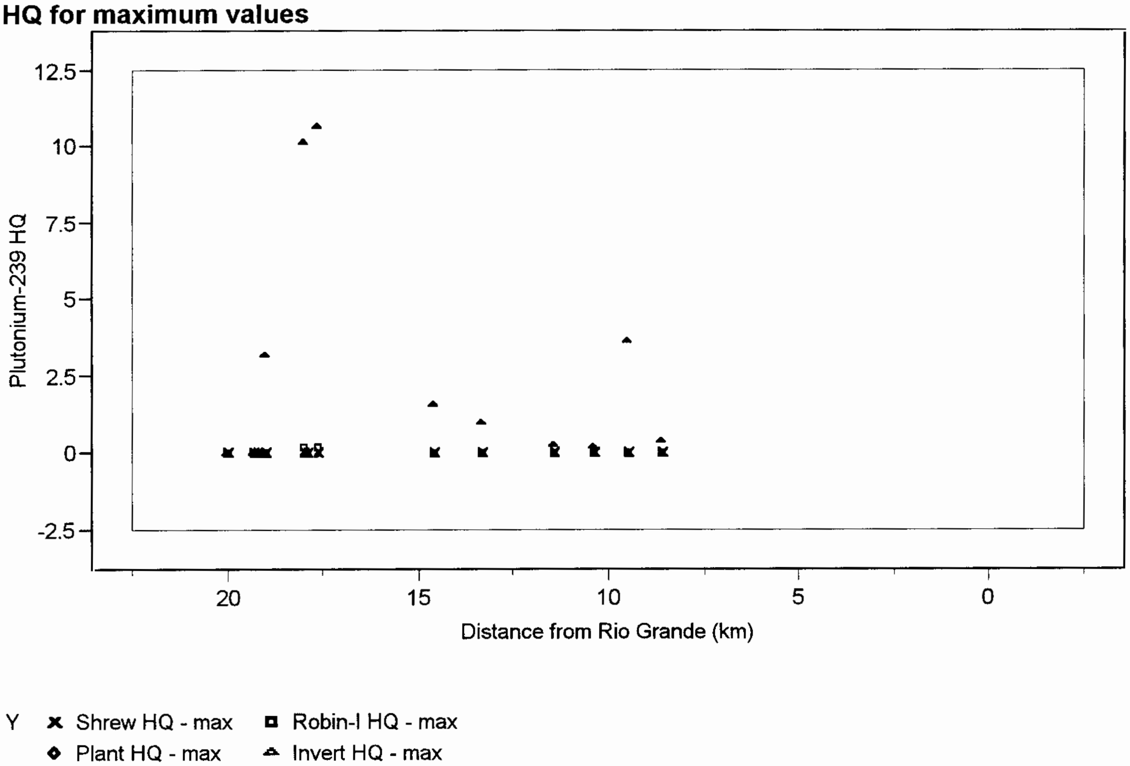
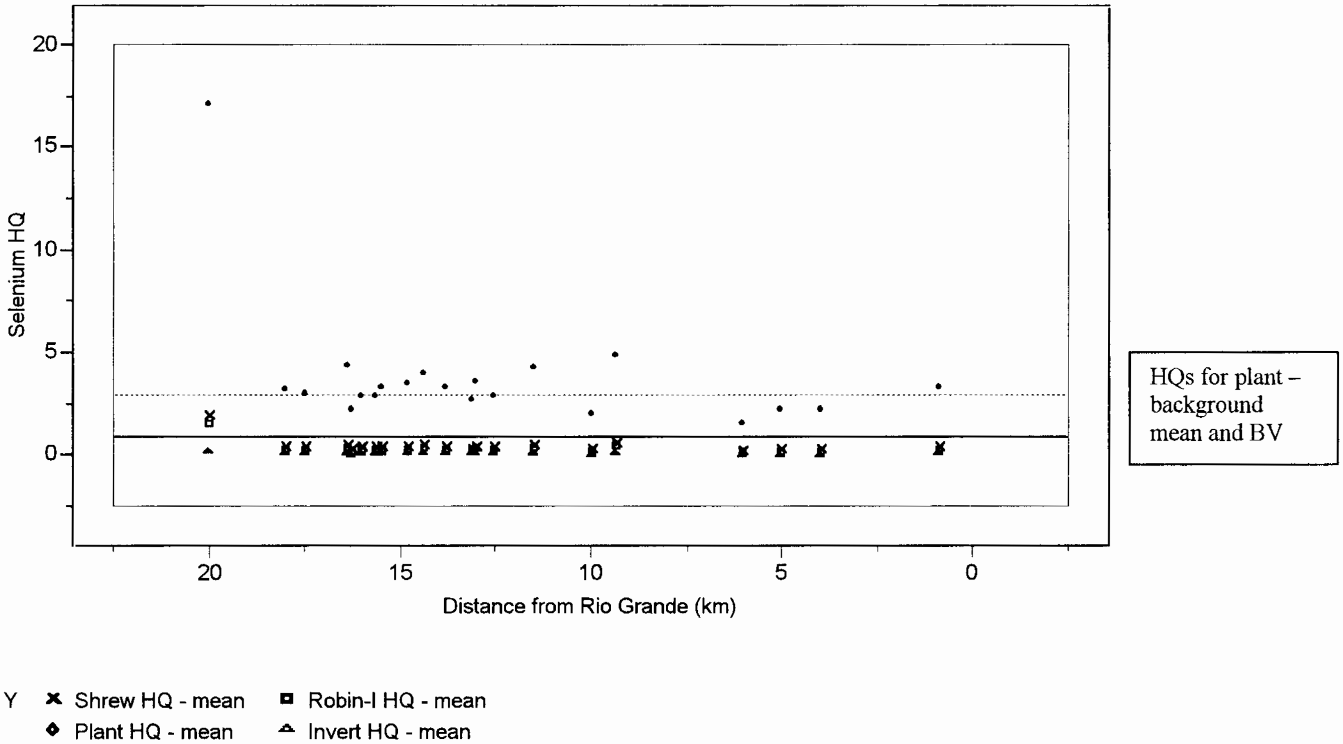
HQ for mean values



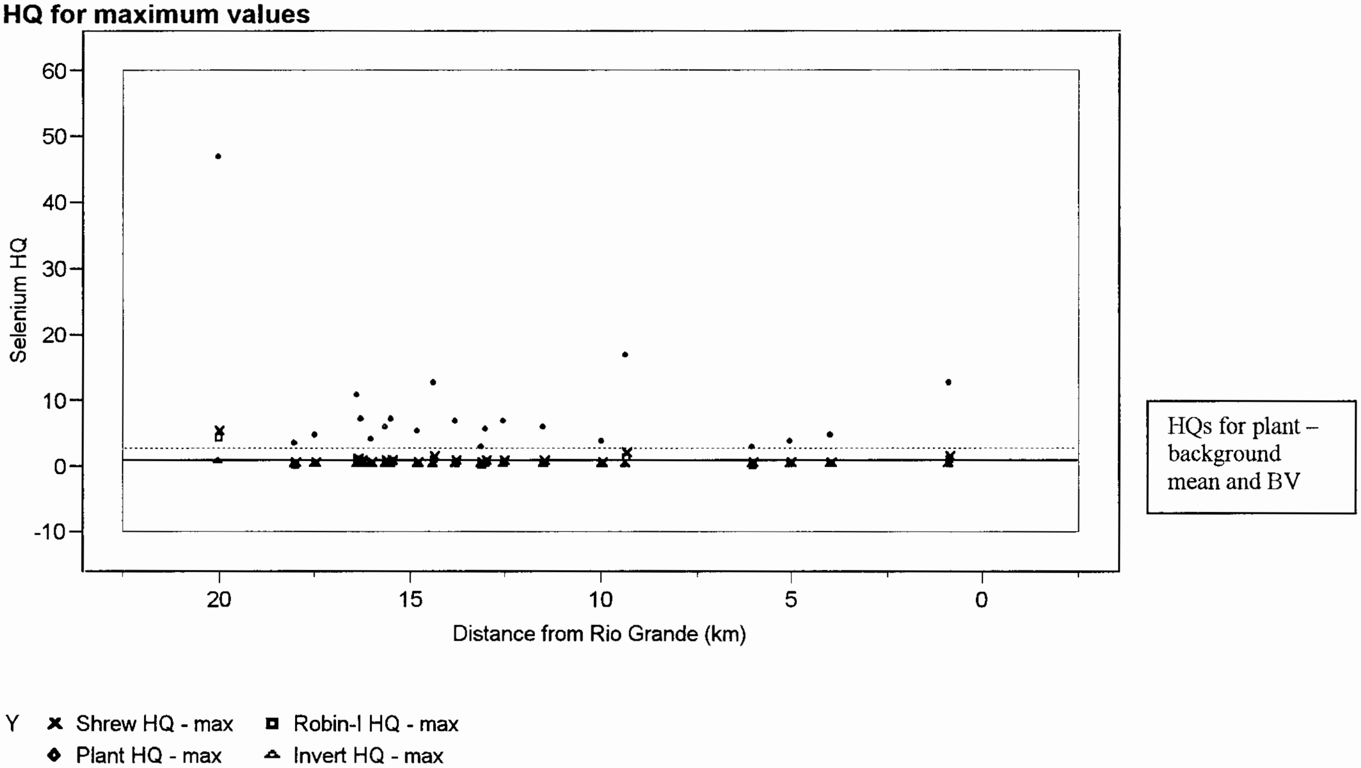
HQ for maximum values



LA/DP Canyons Plot
HQ for mean values

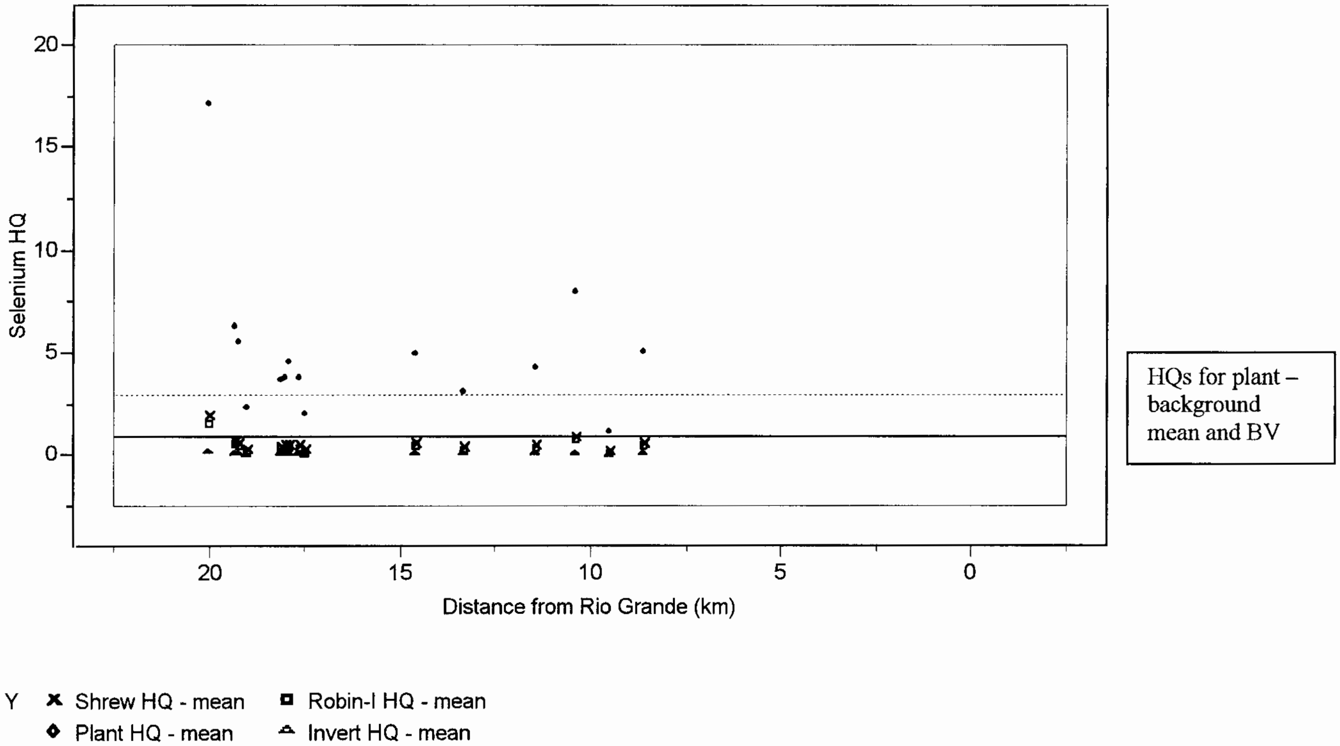


HQ for maximum values

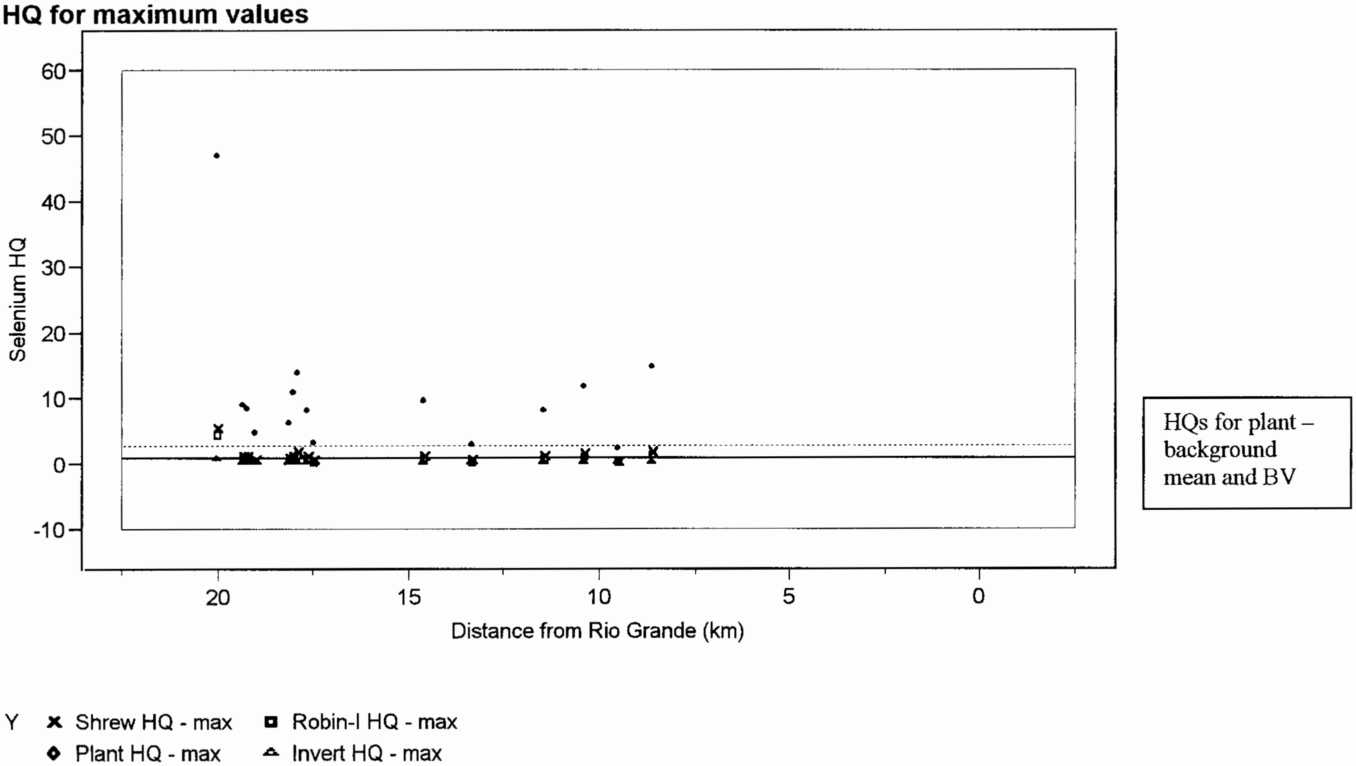


Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

Acid/Pueblo Canyons Plot
HQ for mean values

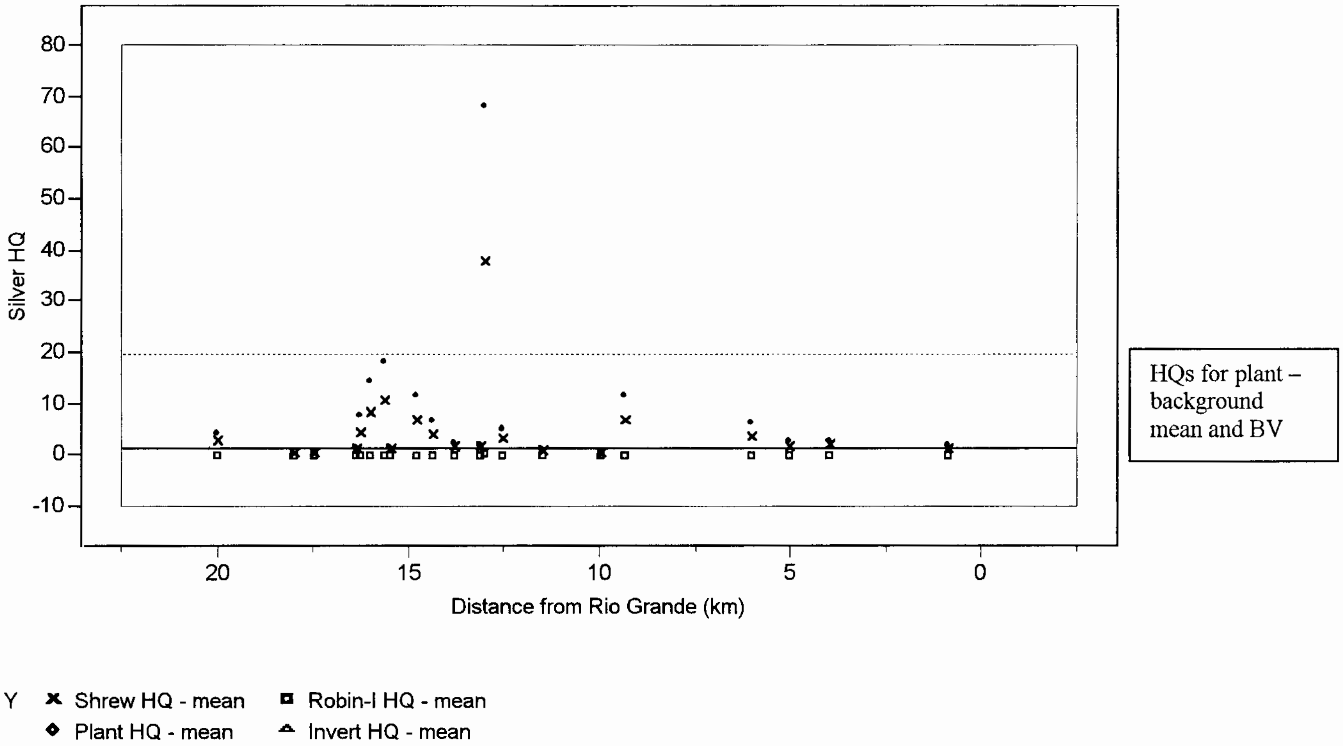


HQ for maximum values

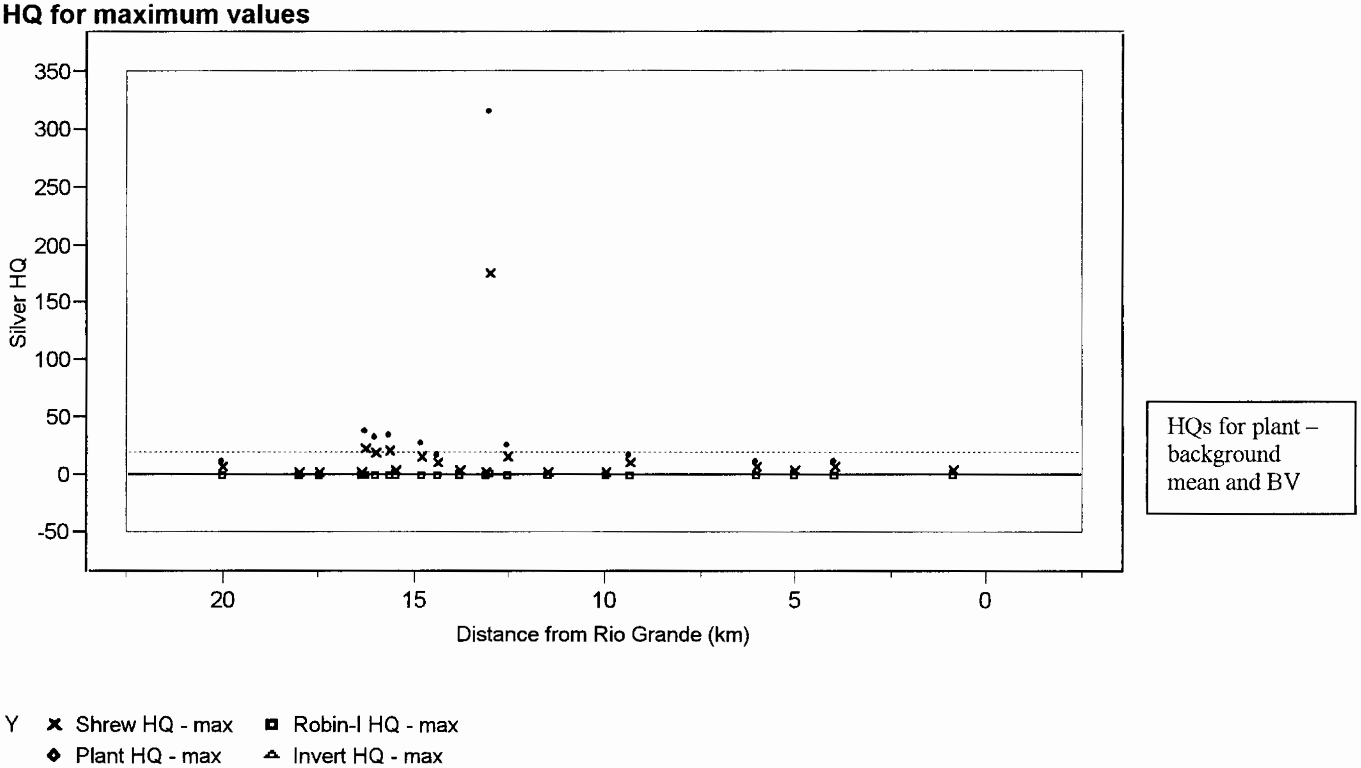


Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

LA/DP Canyons Plot
HQ for mean values

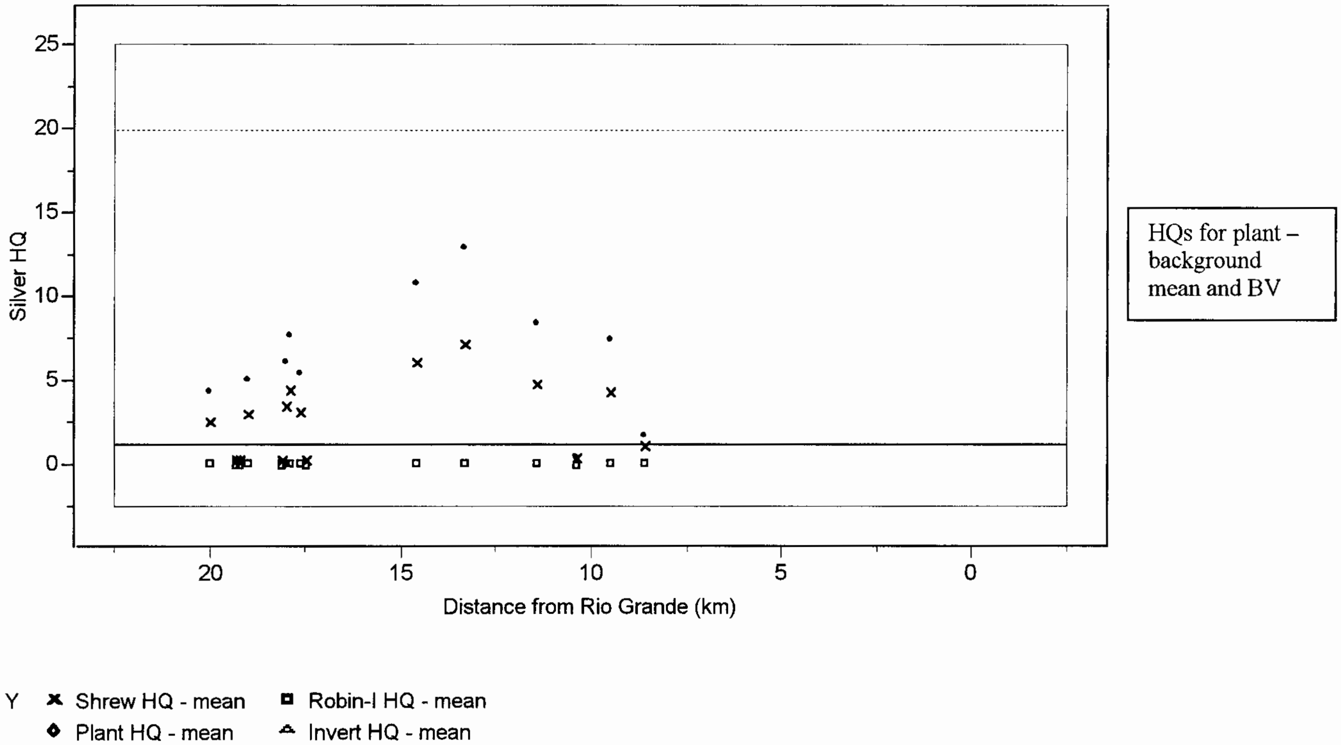


HQ for maximum values

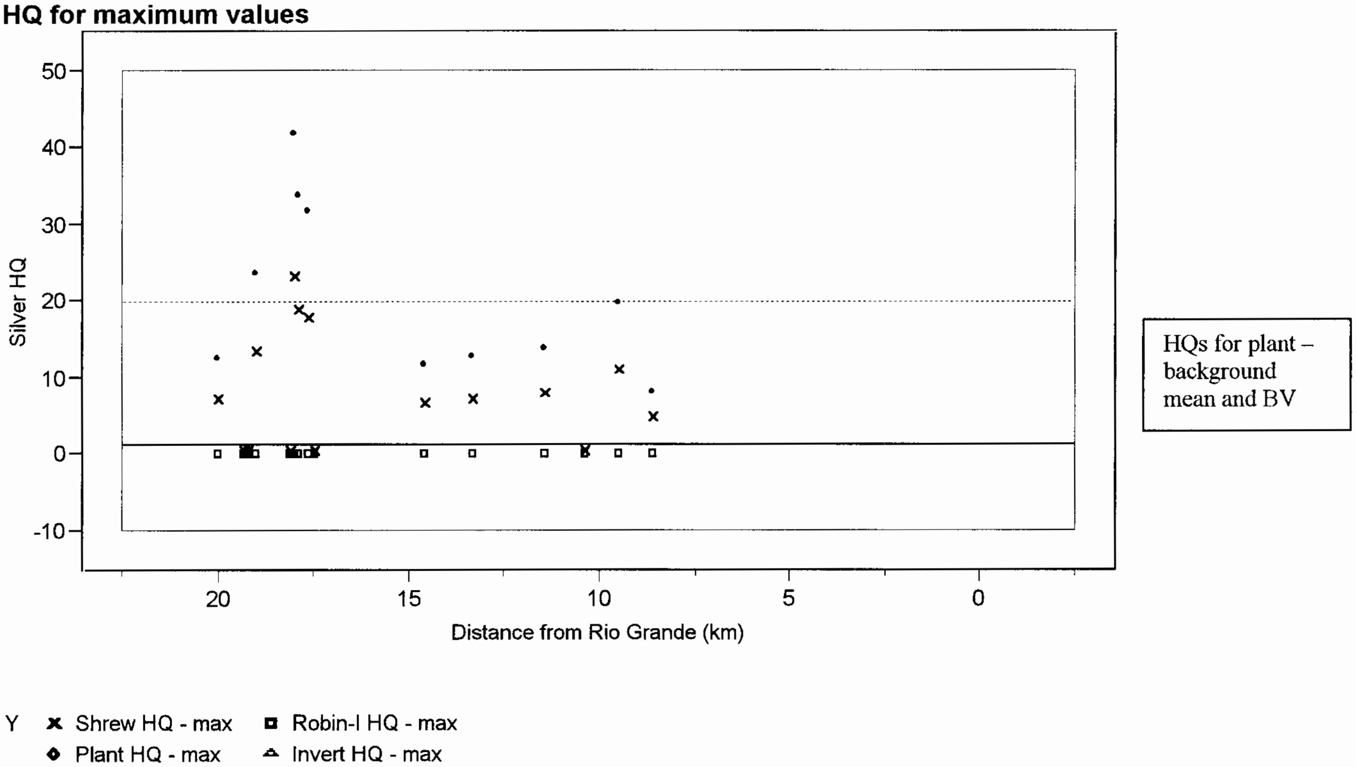


Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

Acid/Pueblo Canyons Plot
HQ for mean values

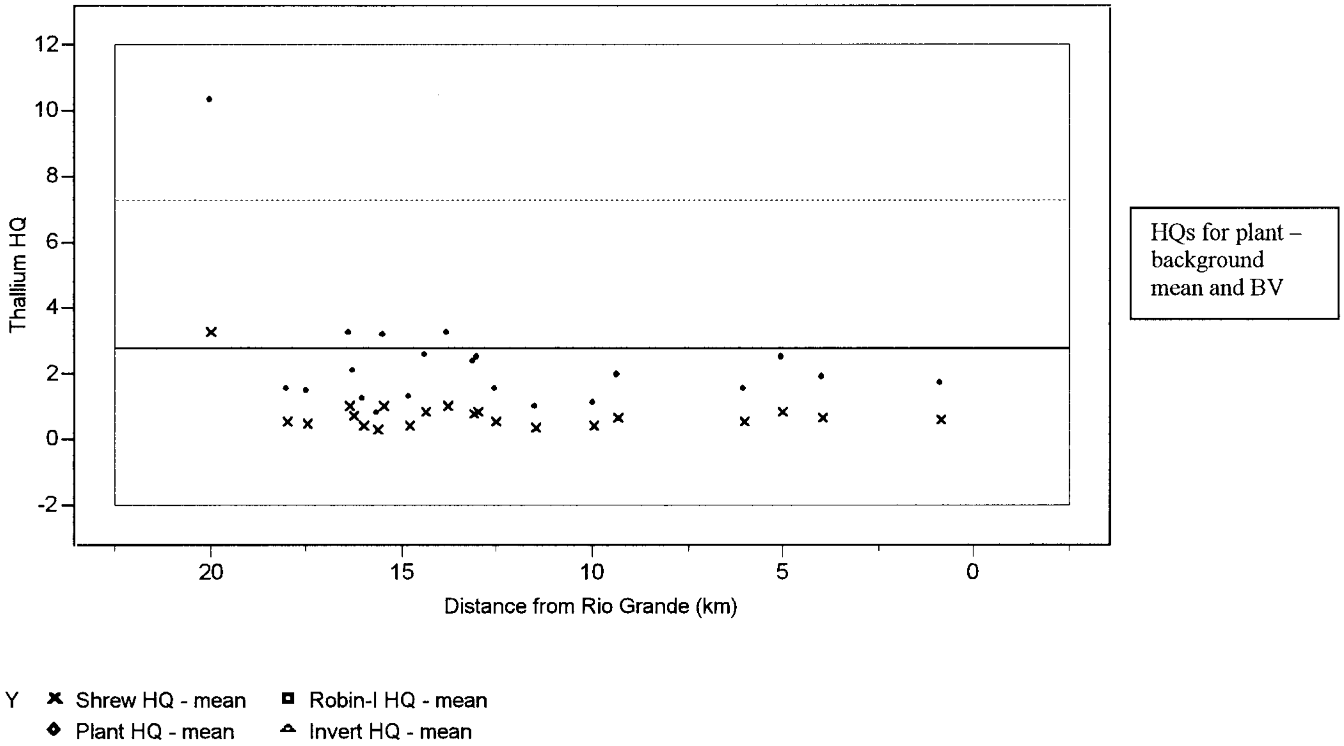


HQ for maximum values



Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

LA/DP Canyons Plot
HQ for mean values



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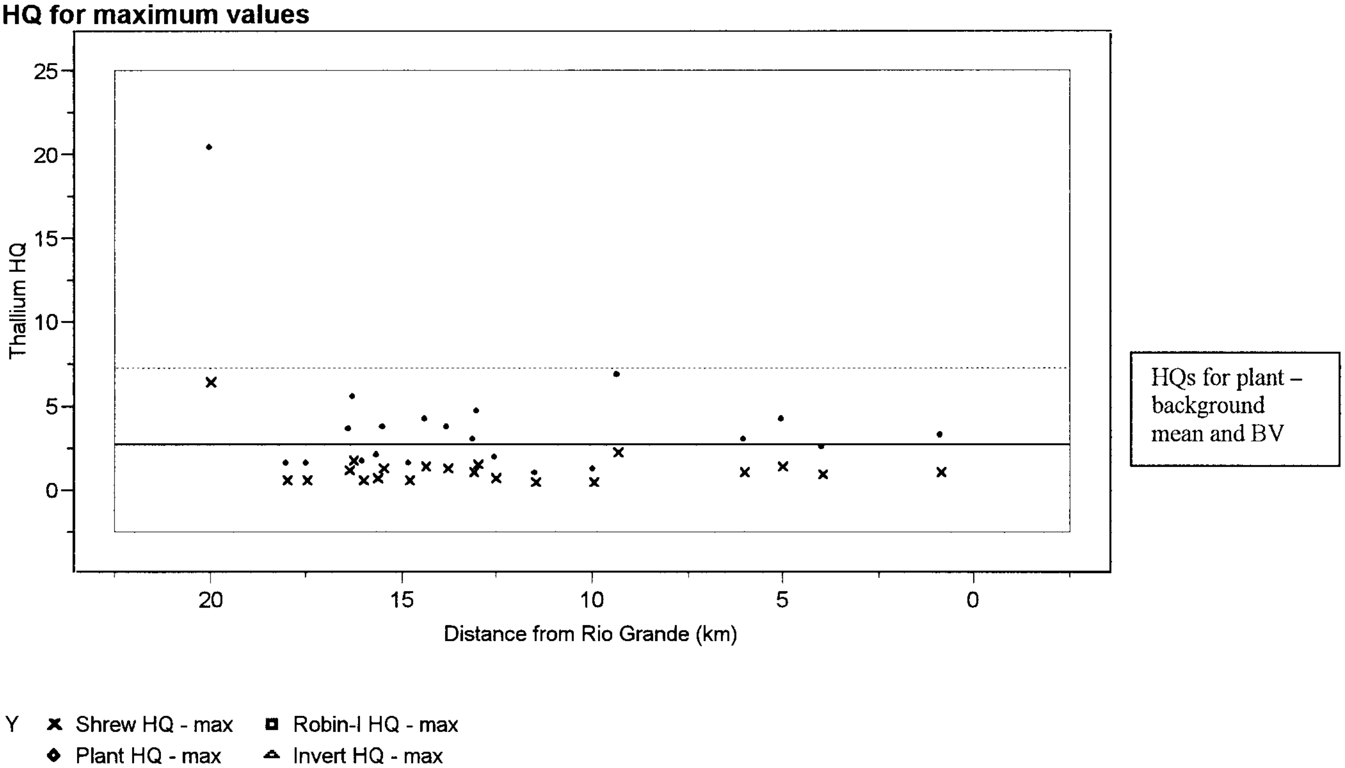
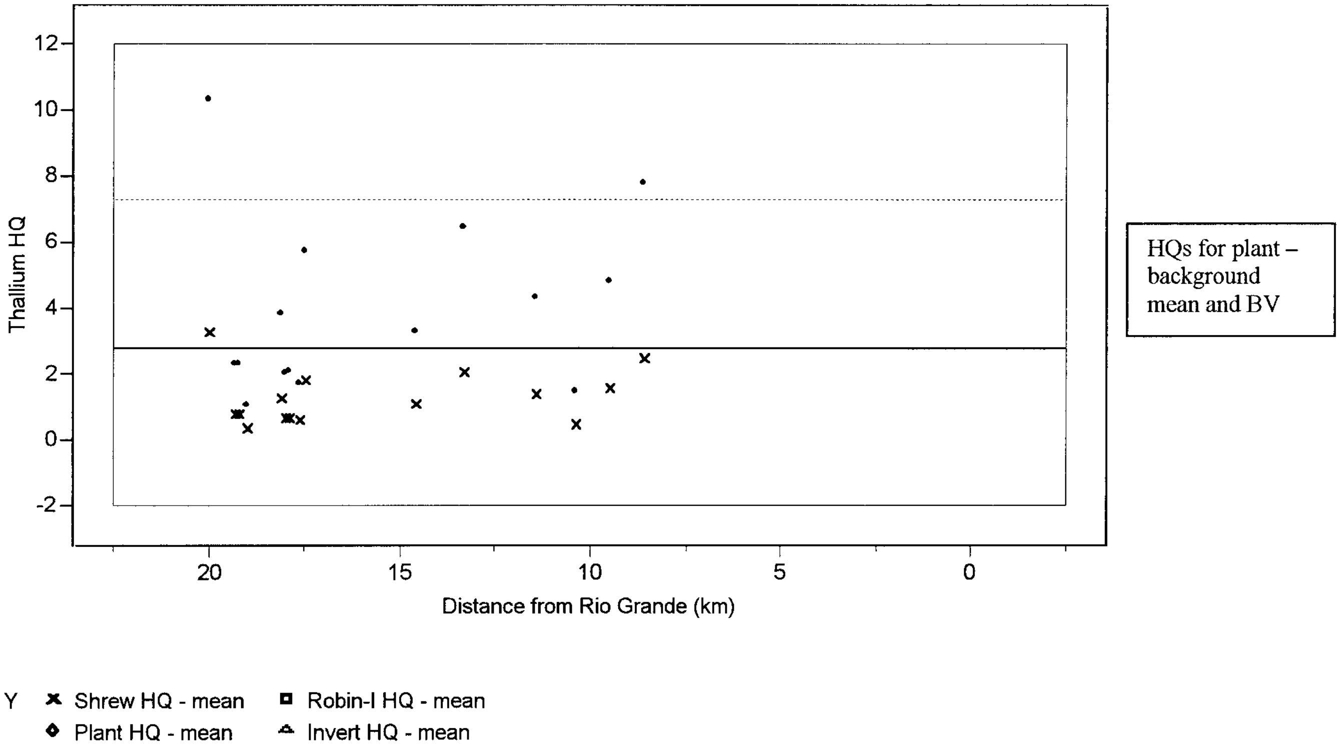
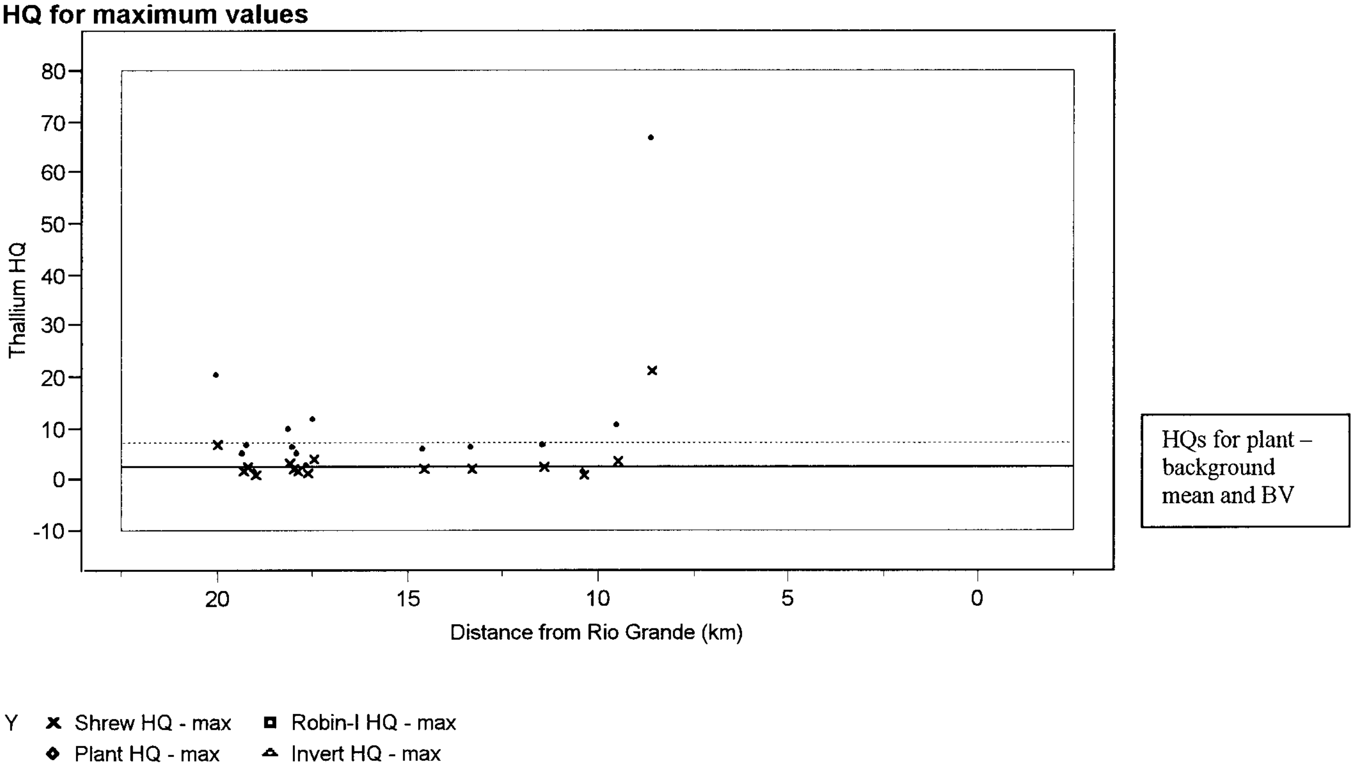


Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

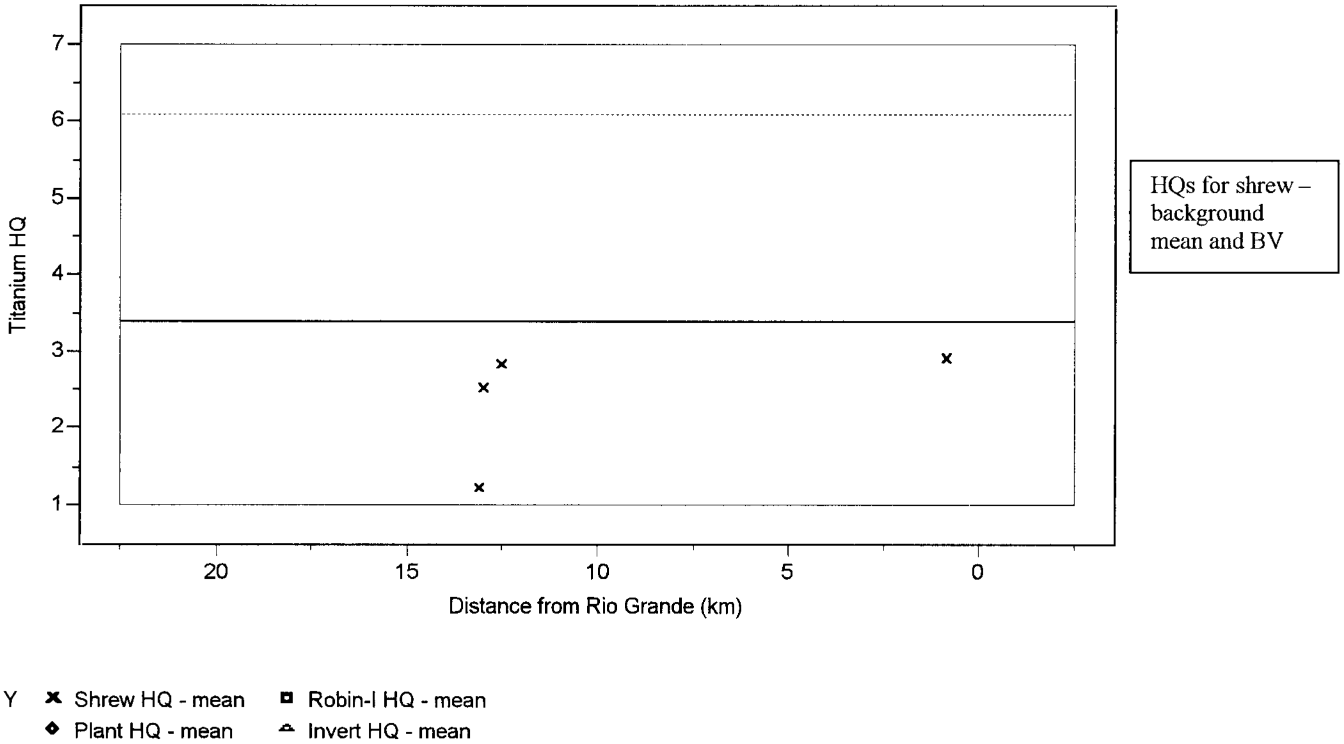
Acid/Pueblo Canyons Plot
HQ for mean values



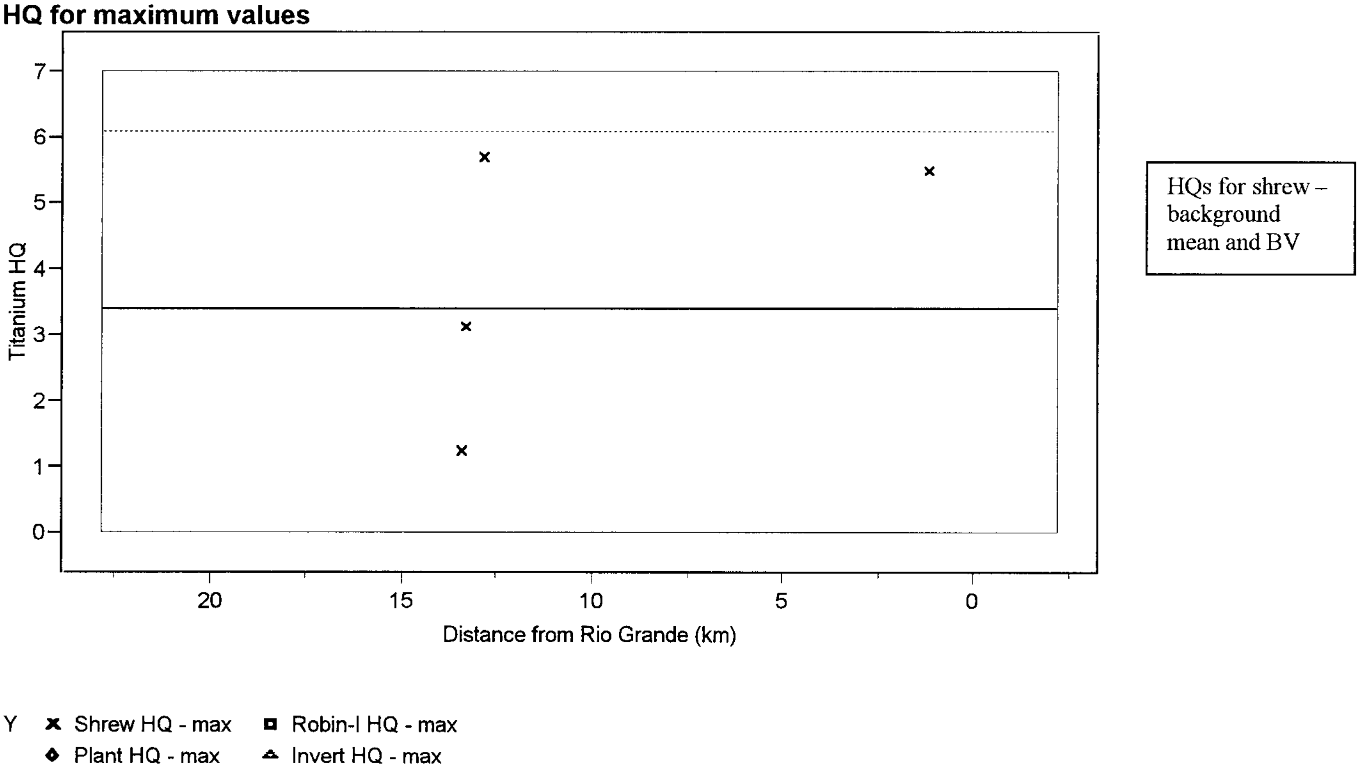
HQ for maximum values



LA/DP Canyons Plot
HQ for mean values



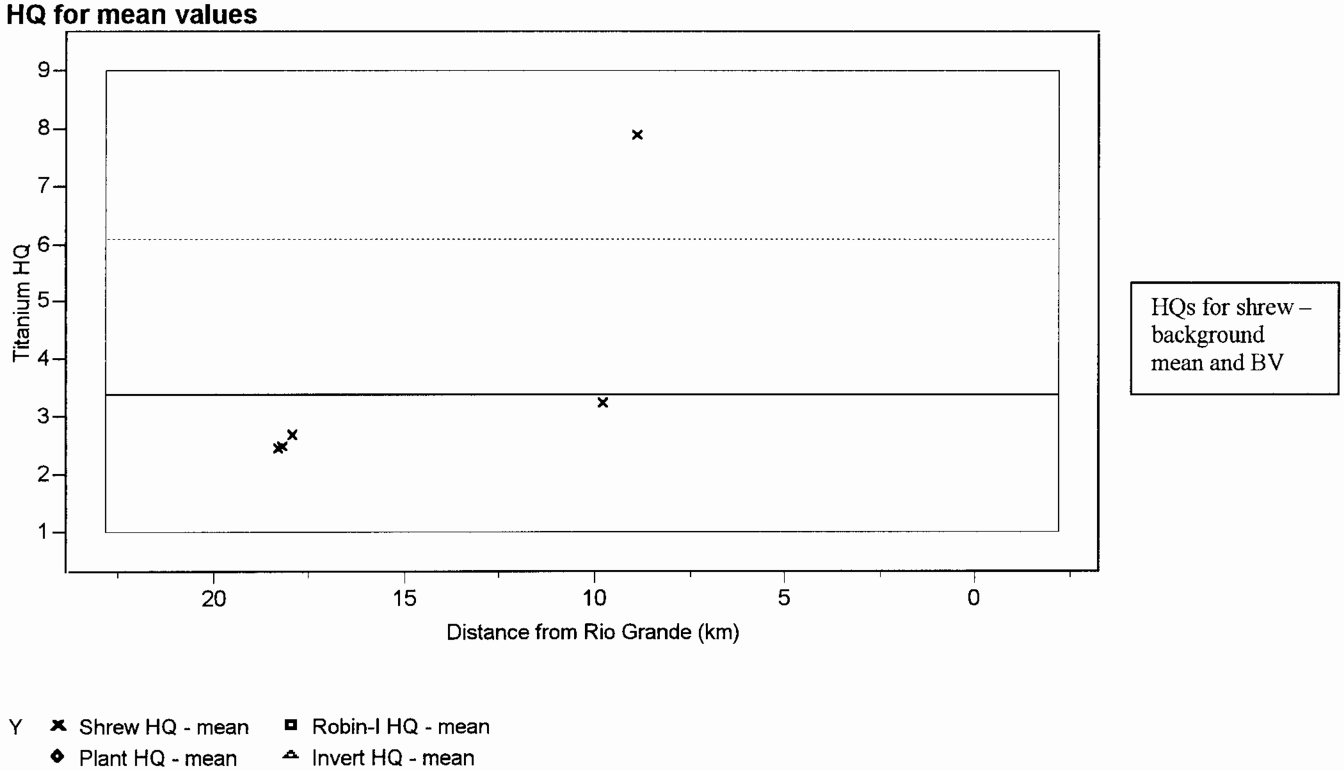
HQ for maximum values



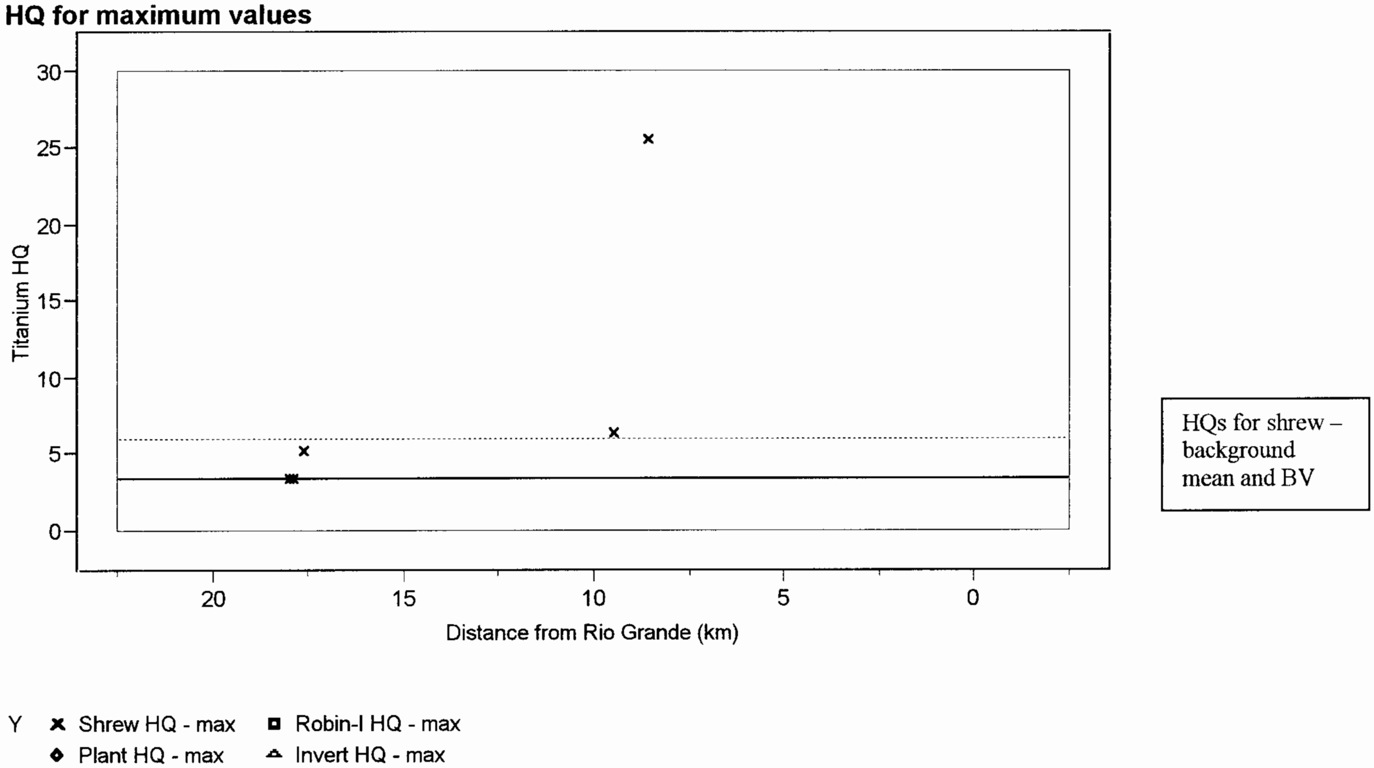
Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

Acid/Pueblo Canyons Plot

HQ for mean values

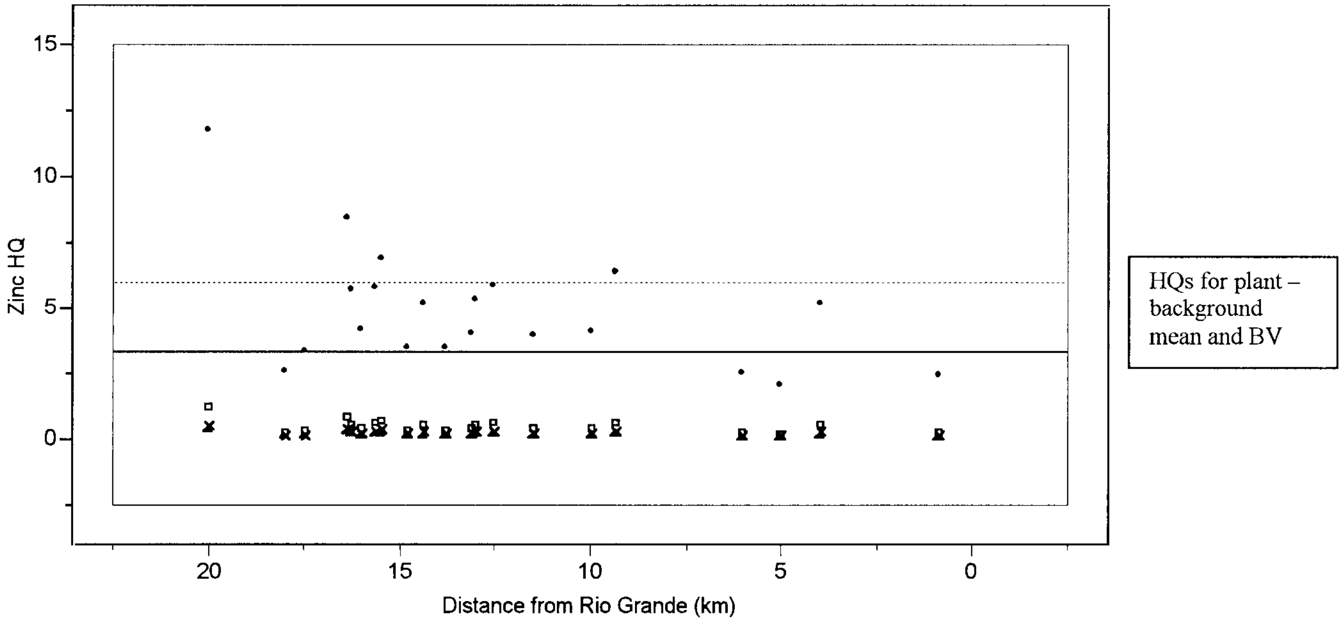


HQ for maximum values



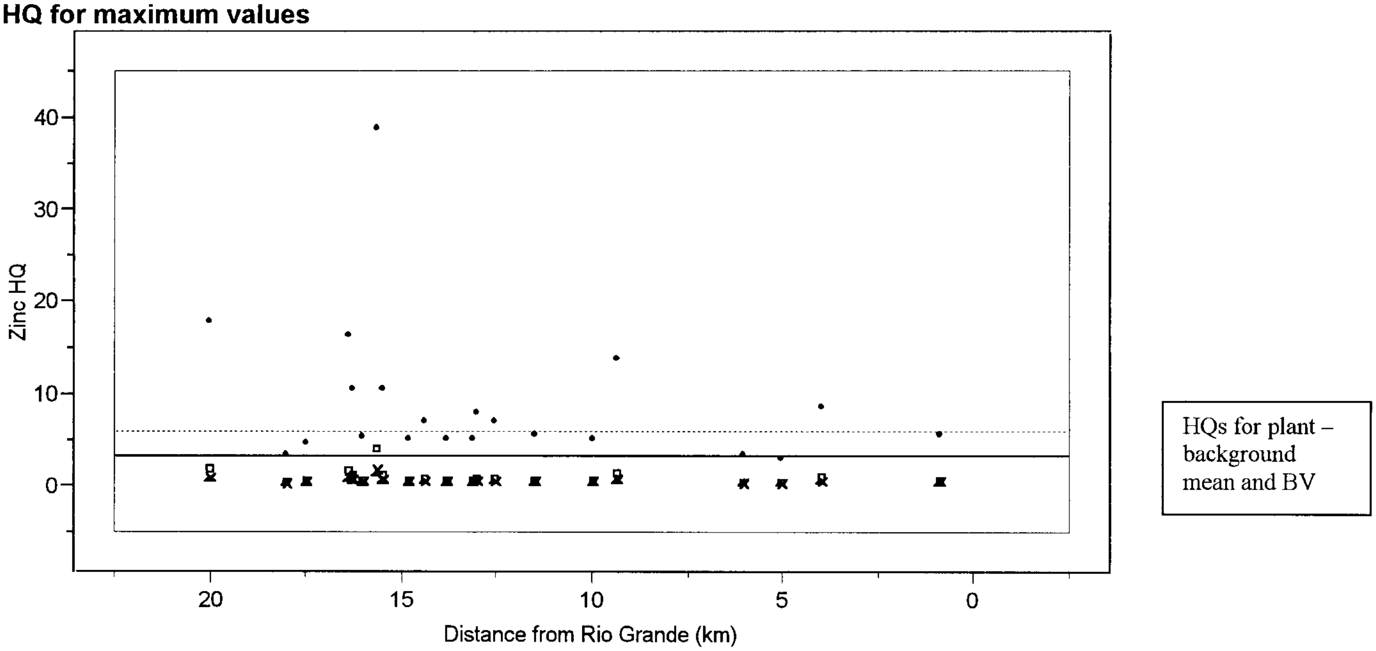
Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

LA/DP Canyons Plot
HQ for mean values



Y ✕ Shrew HQ - mean ◘ Robin-I HQ - mean
◆ Plant HQ - mean △ Invert HQ - mean

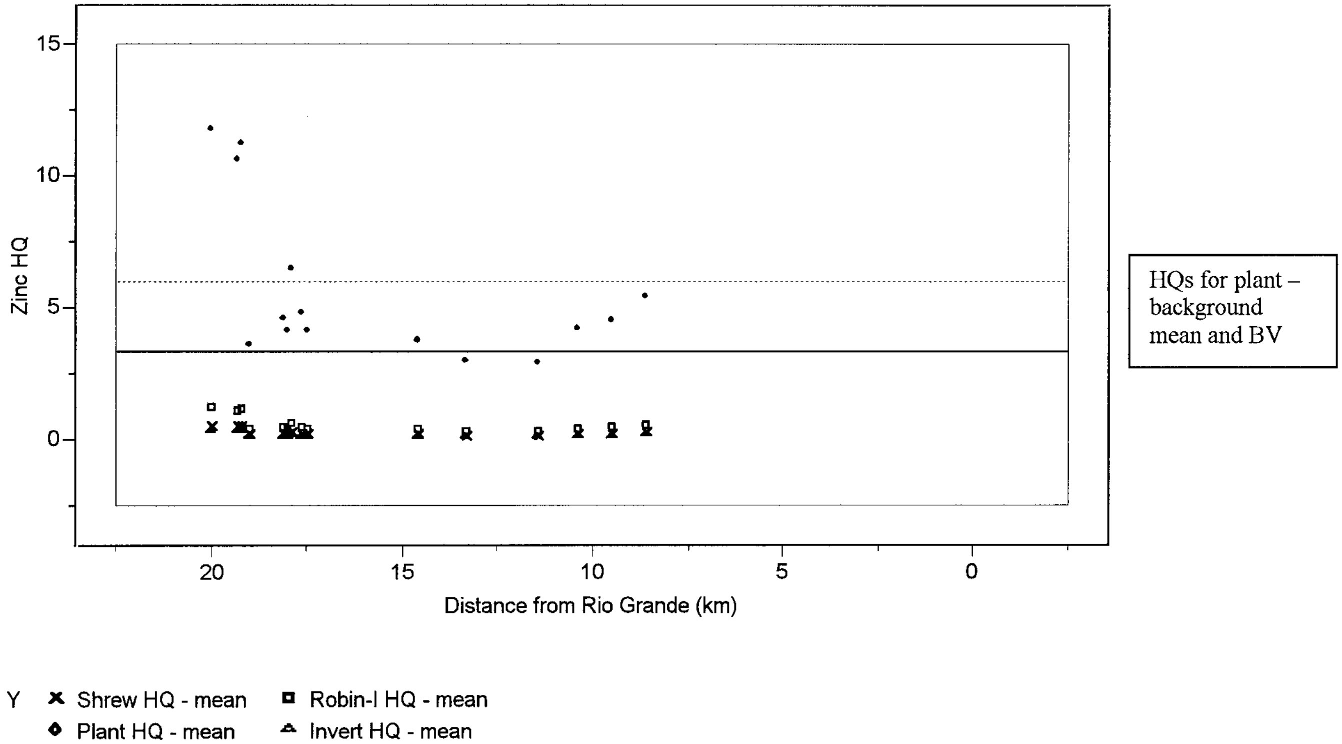
HQ for maximum values



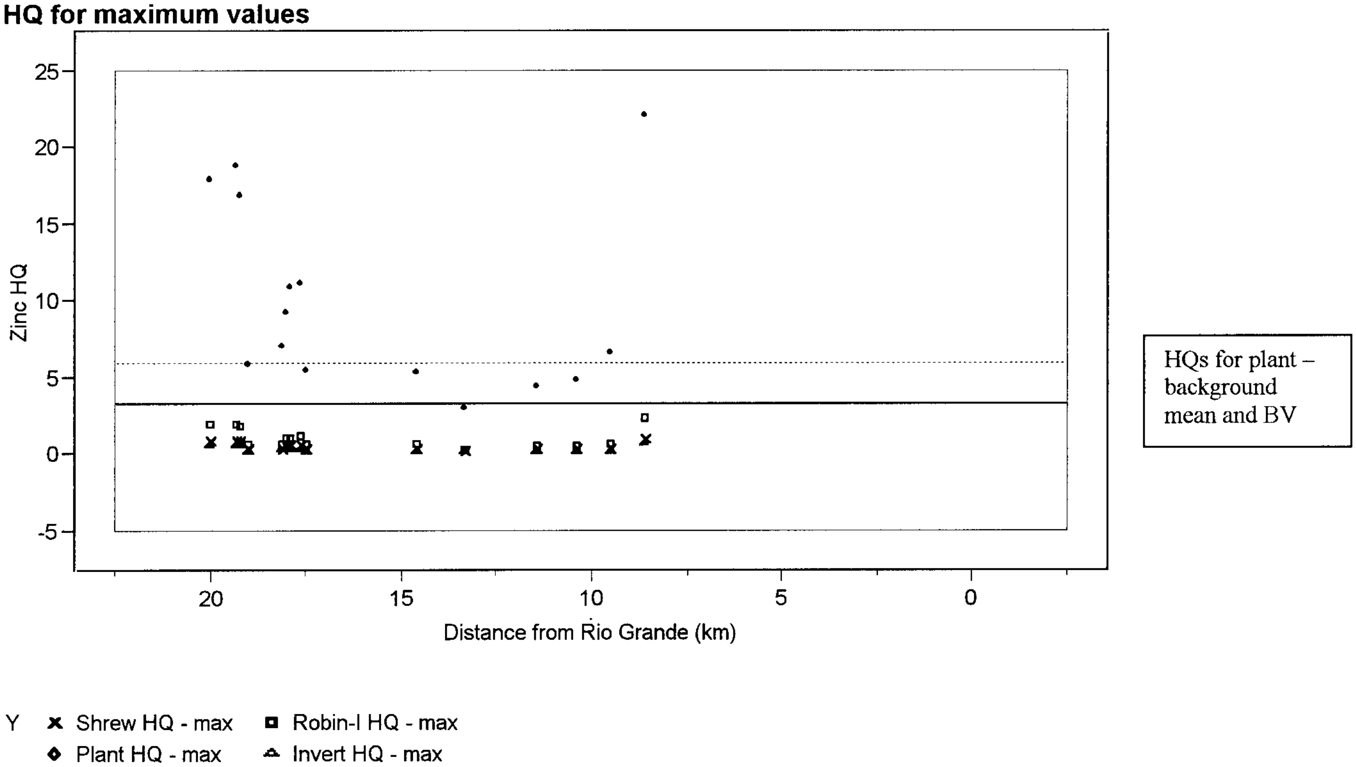
Y ✕ Shrew HQ - max ◘ Robin-I HQ - max
◆ Plant HQ - max △ Invert HQ - max

Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

Acid/Pueblo Canyons Plot
HQ for mean values

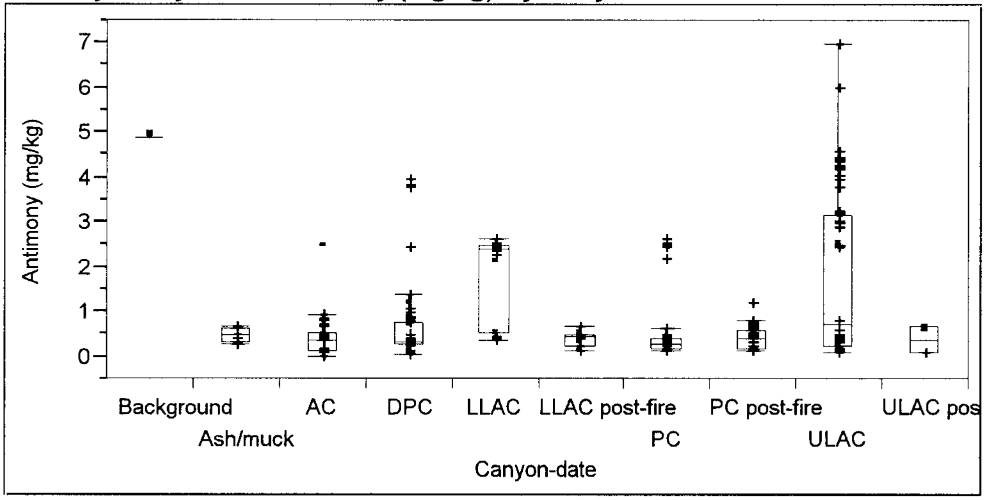


HQ for maximum values

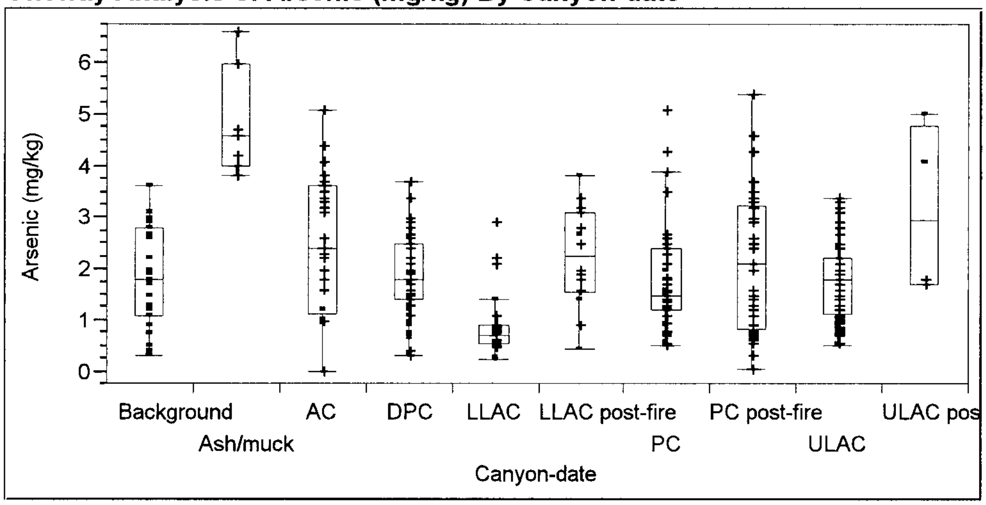


Statistics are based on replacing non-detects in working data with ½ of detection limits; Includes both pre- and post-fire data

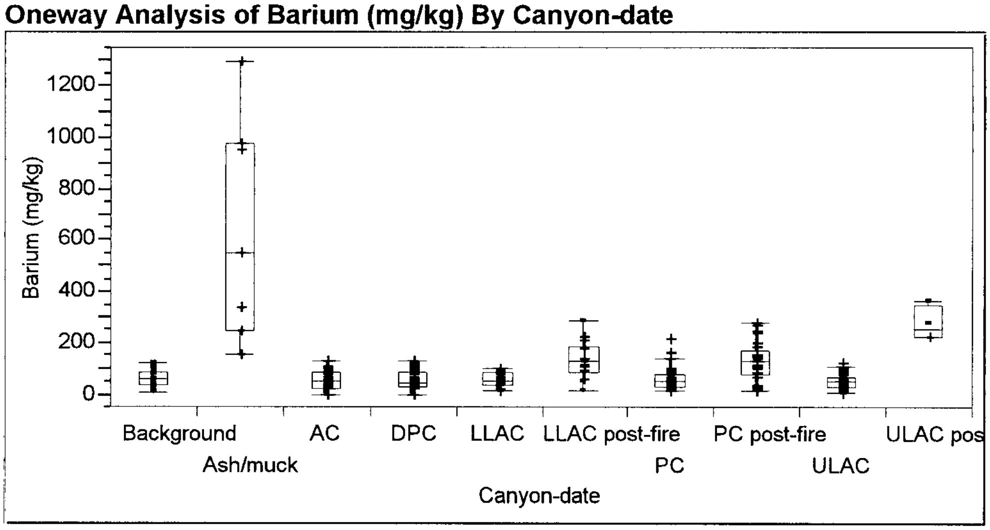
Oneway Analysis of Antimony (mg/kg) By Canyon-date



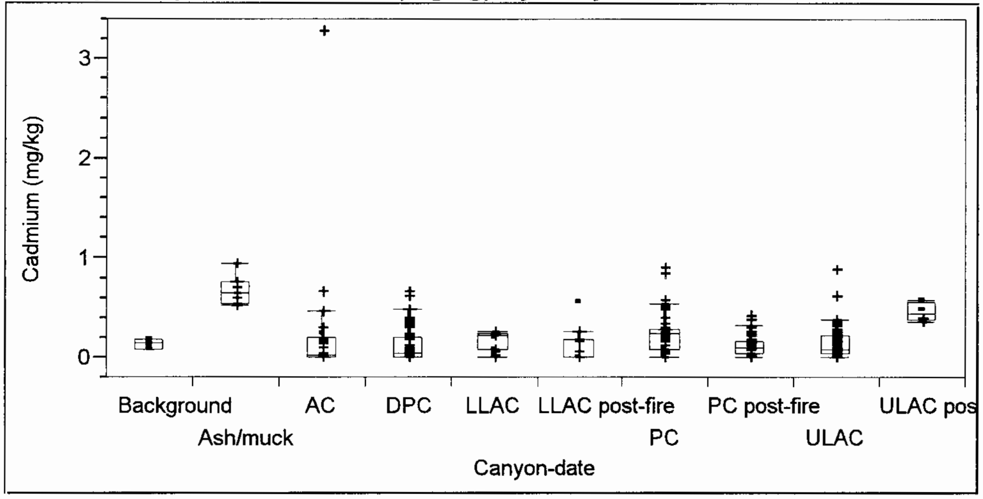
Oneway Analysis of Arsenic (mg/kg) By Canyon-date



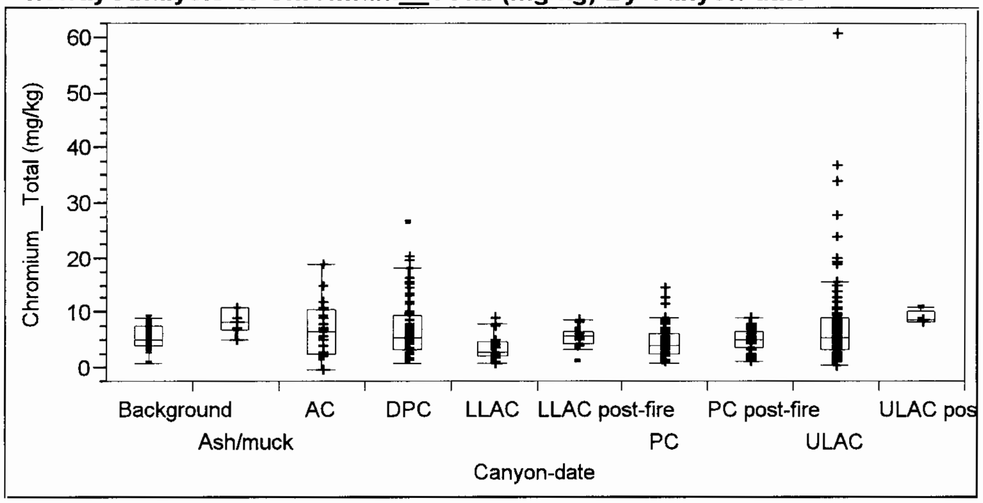
Oneway Analysis of Barium (mg/kg) By Canyon-date



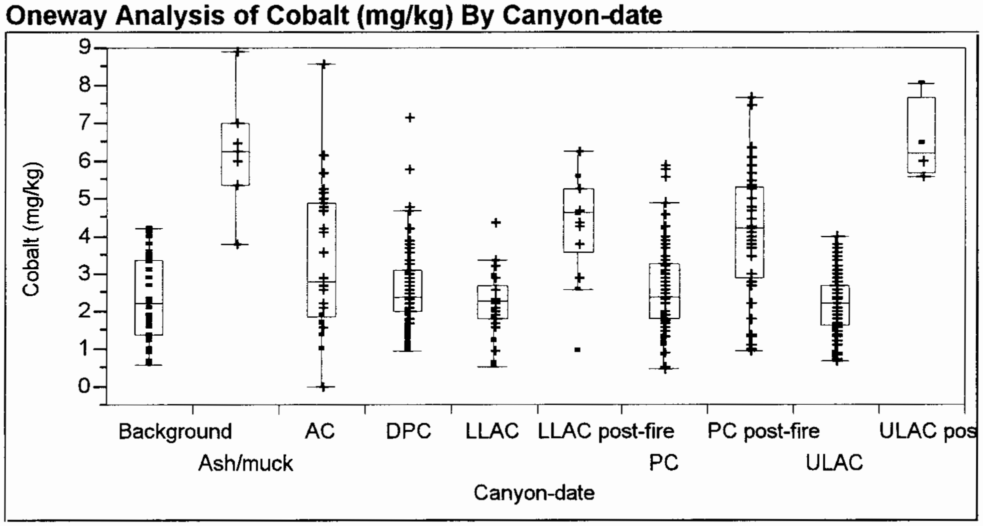
Oneway Analysis of Cadmium (mg/kg) By Canyon-date



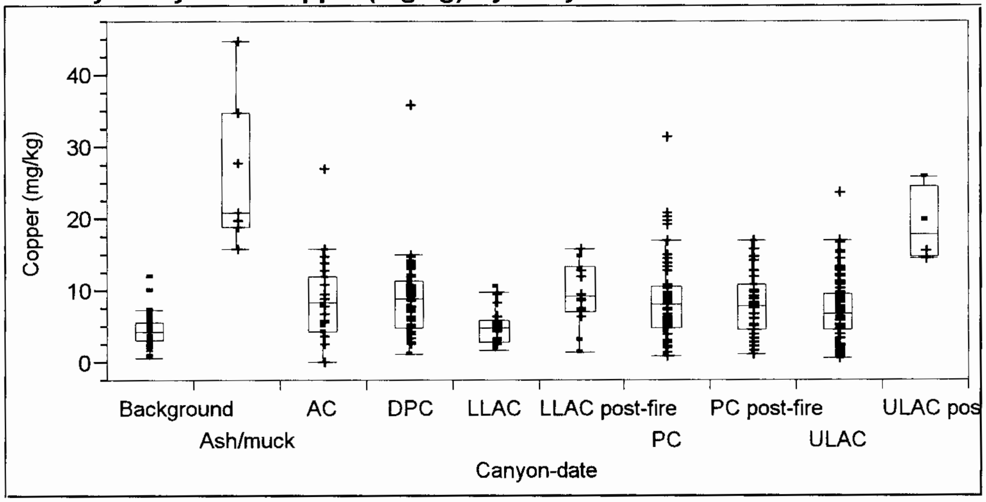
Oneway Analysis of Chromium__Total (mg/kg) By Canyon-date



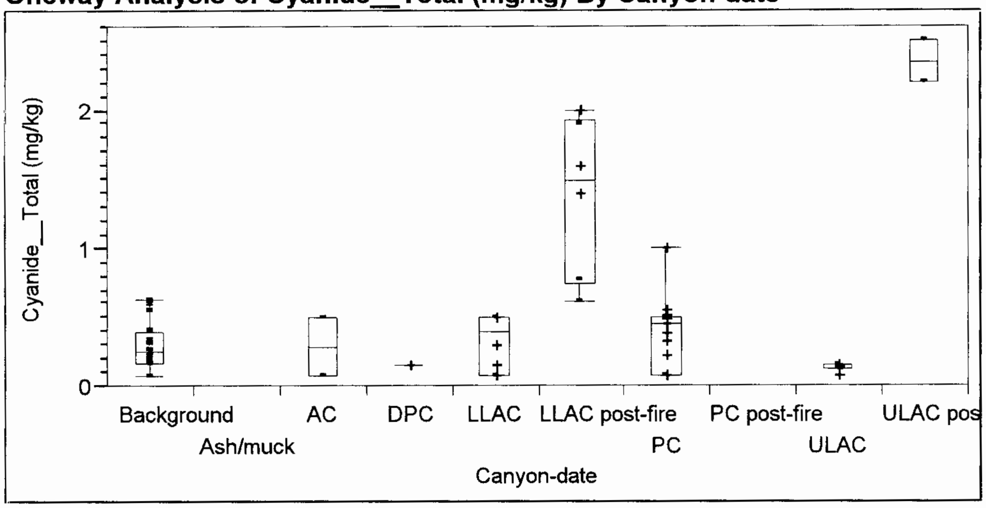
Oneway Analysis of Cobalt (mg/kg) By Canyon-date



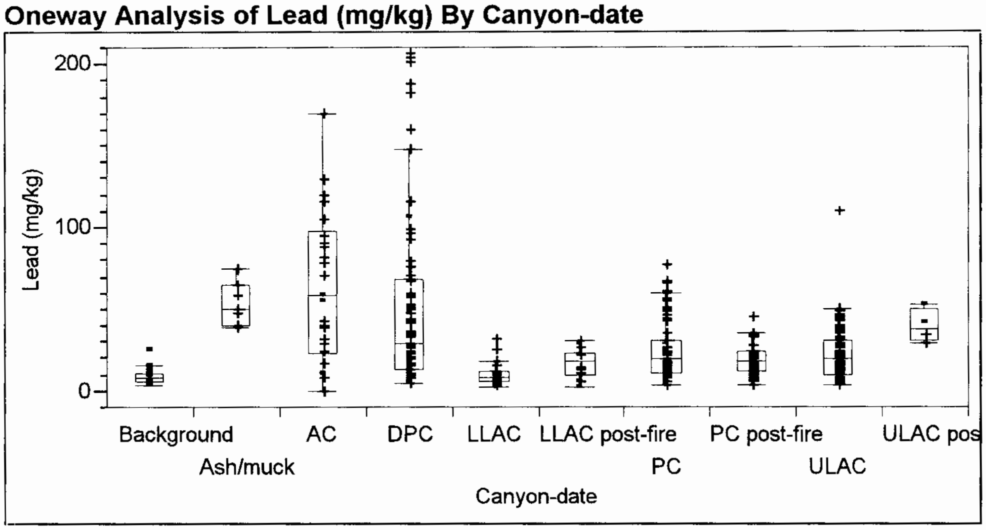
Oneway Analysis of Copper (mg/kg) By Canyon-date



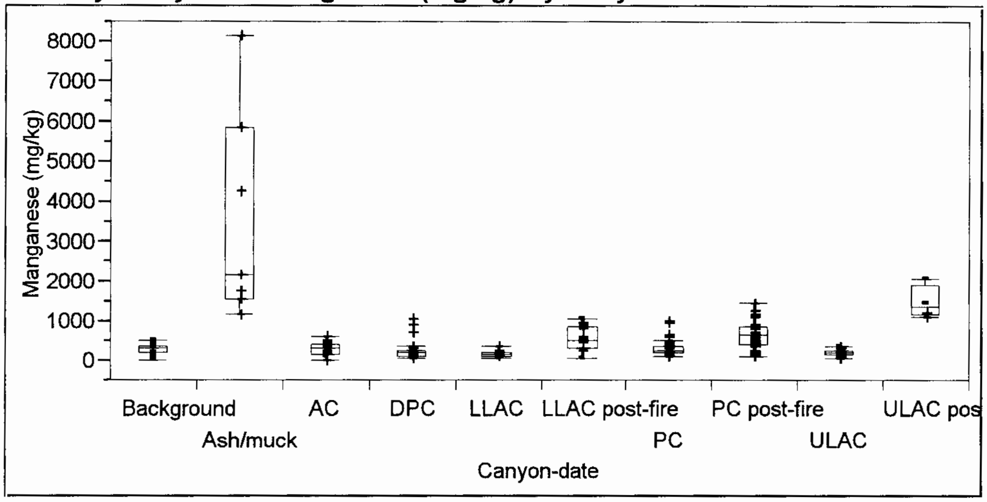
Oneway Analysis of Cyanide__Total (mg/kg) By Canyon-date



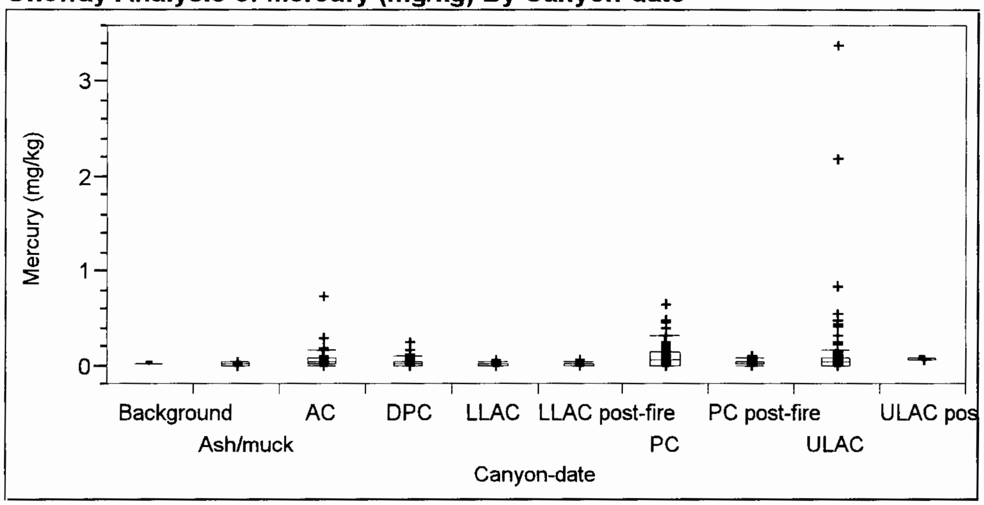
Oneway Analysis of Lead (mg/kg) By Canyon-date



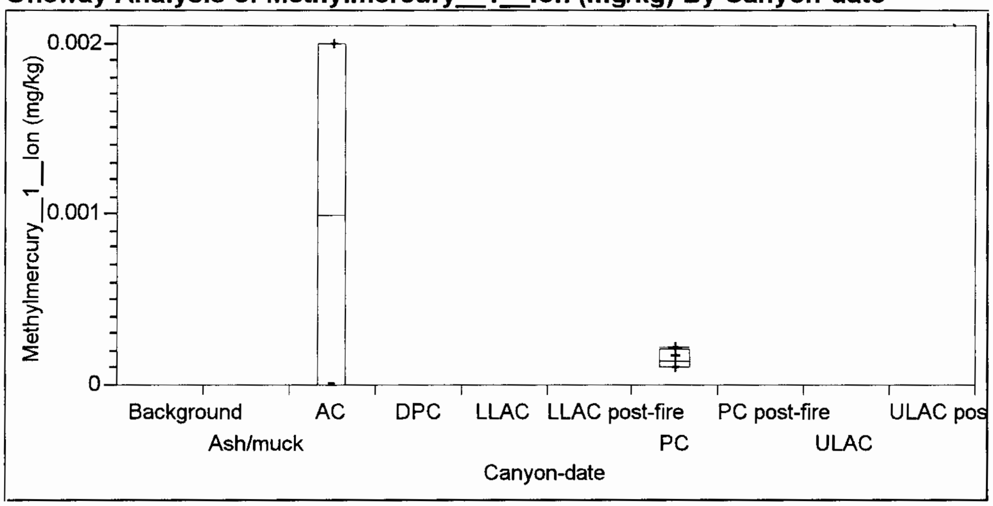
Oneway Analysis of Manganese (mg/kg) By Canyon-date



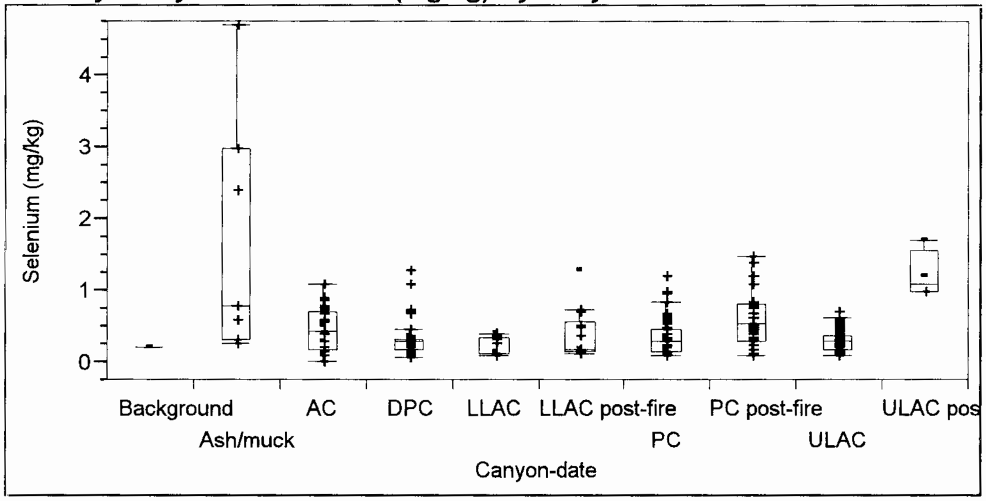
Oneway Analysis of Mercury (mg/kg) By Canyon-date



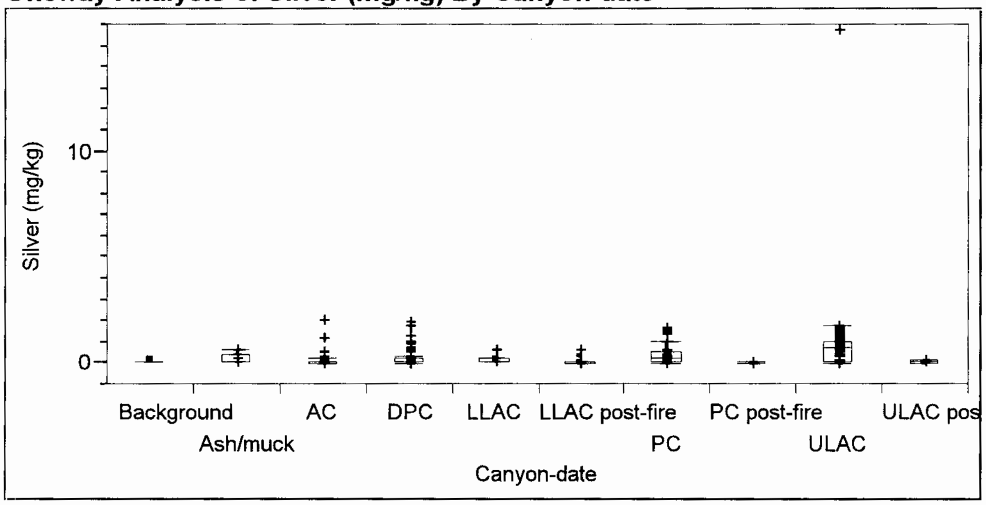
Oneway Analysis of Methylmercury__1__Ion (mg/kg) By Canyon-date



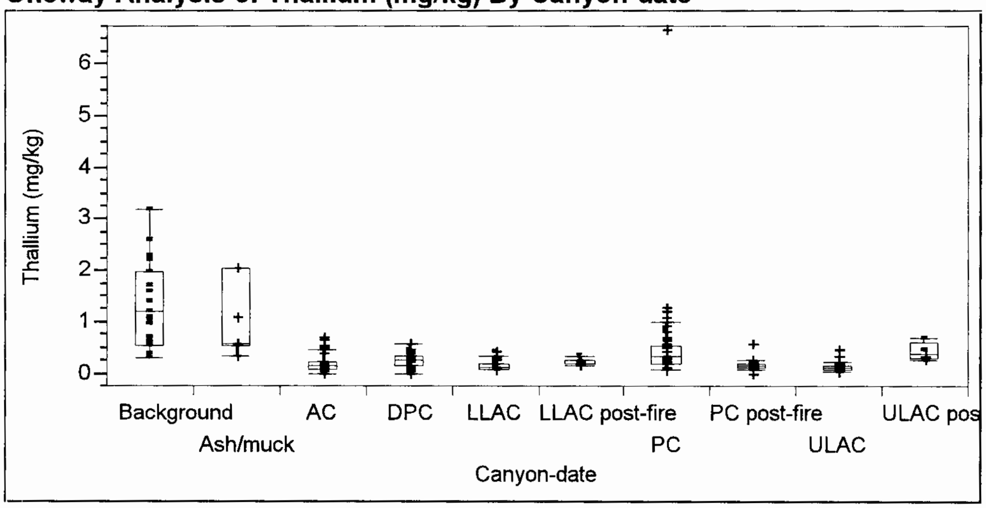
Oneway Analysis of Selenium (mg/kg) By Canyon-date



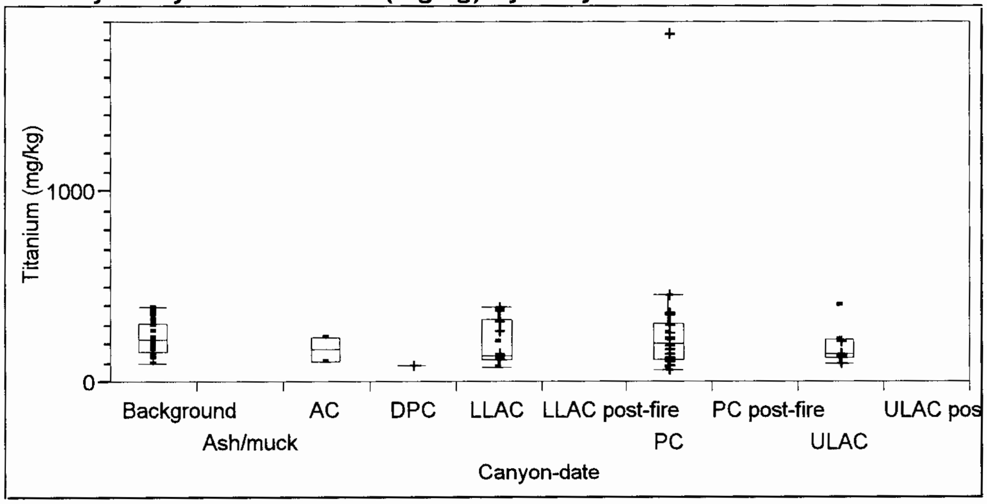
Oneway Analysis of Silver (mg/kg) By Canyon-date



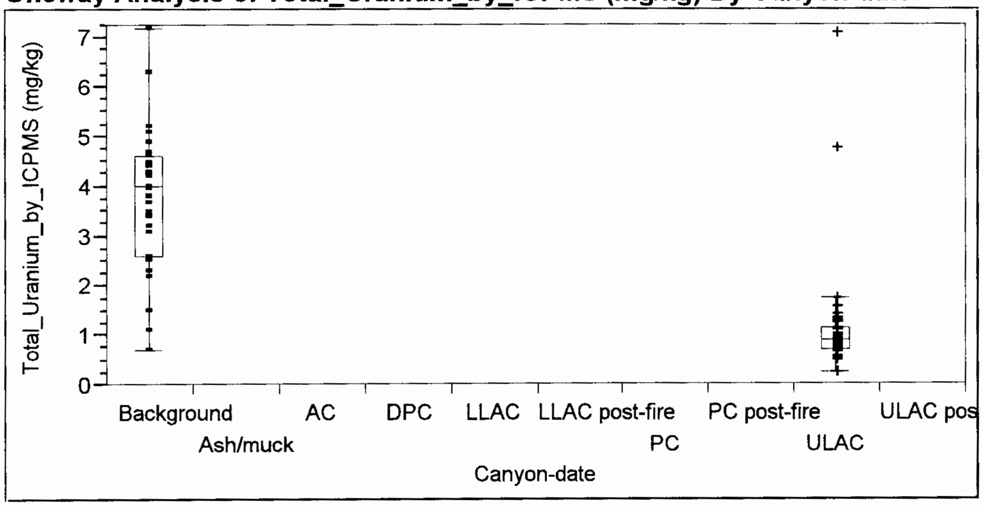
Oneway Analysis of Thallium (mg/kg) By Canyon-date



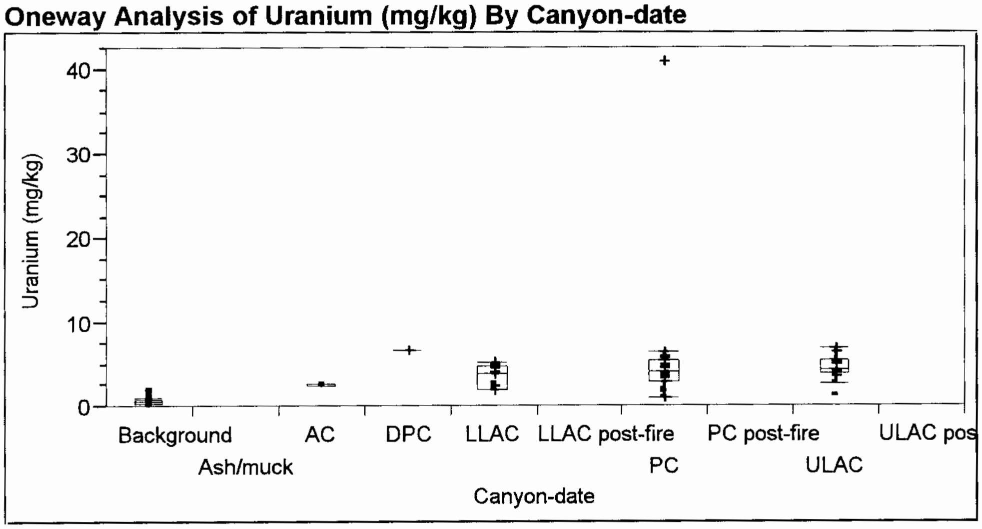
Oneway Analysis of Titanium (mg/kg) By Canyon-date



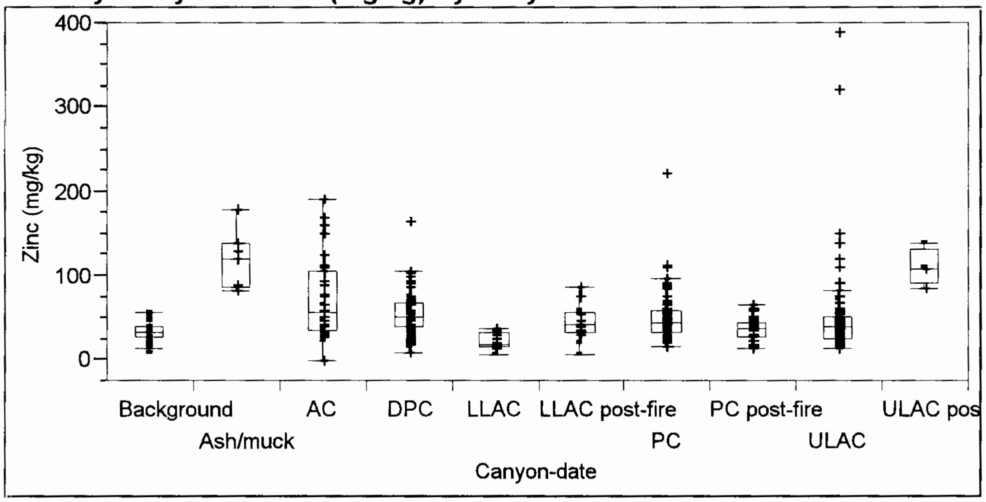
Oneway Analysis of Total_Uranium_by_ICPMS (mg/kg) By Canyon-date

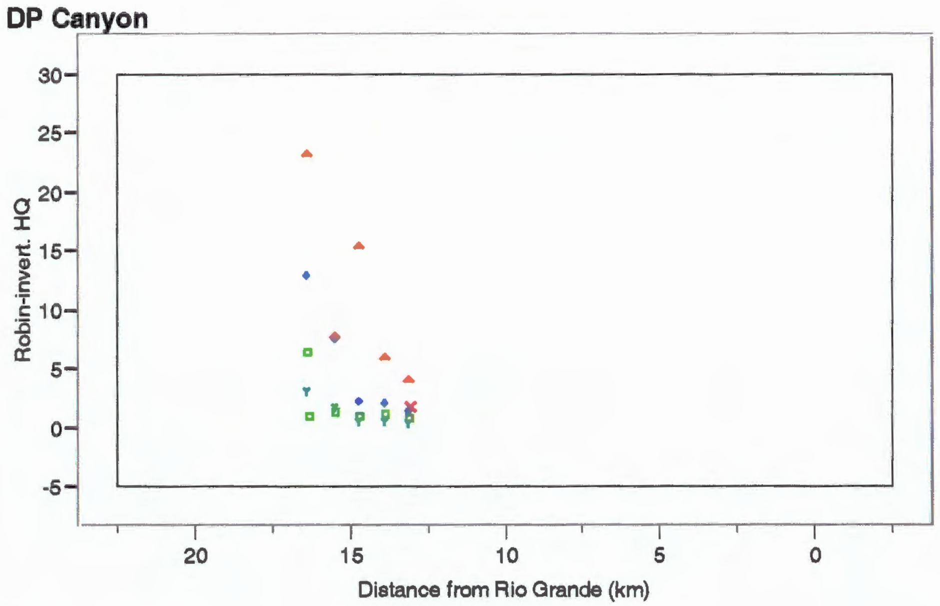


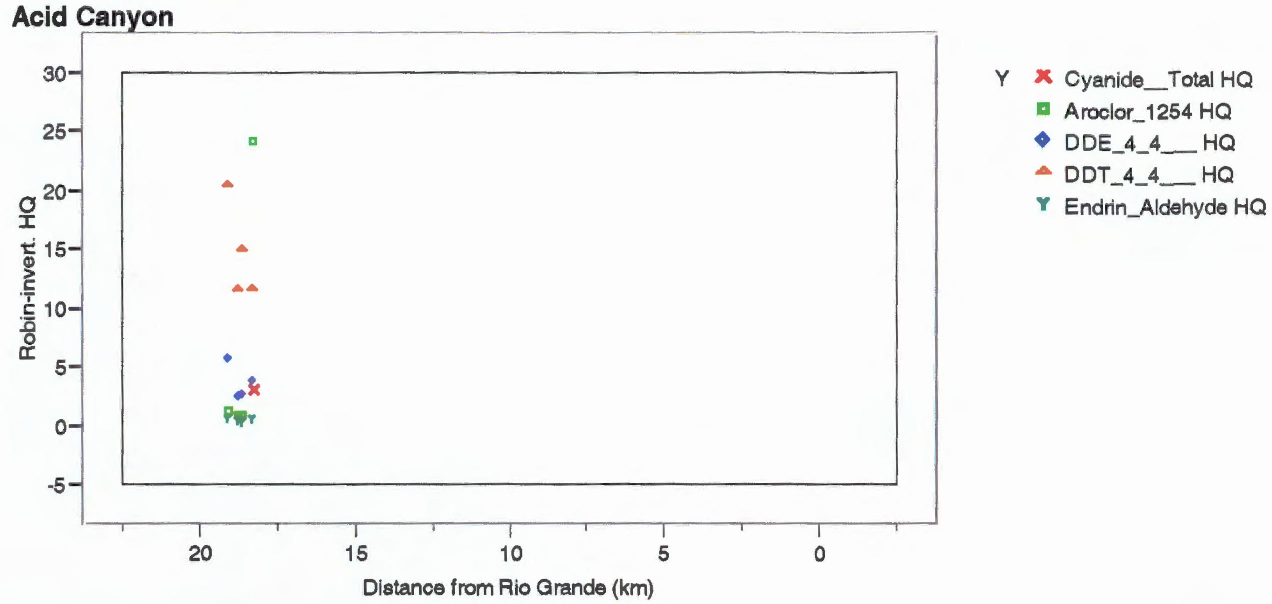
Oneway Analysis of Uranium (mg/kg) By Canyon-date

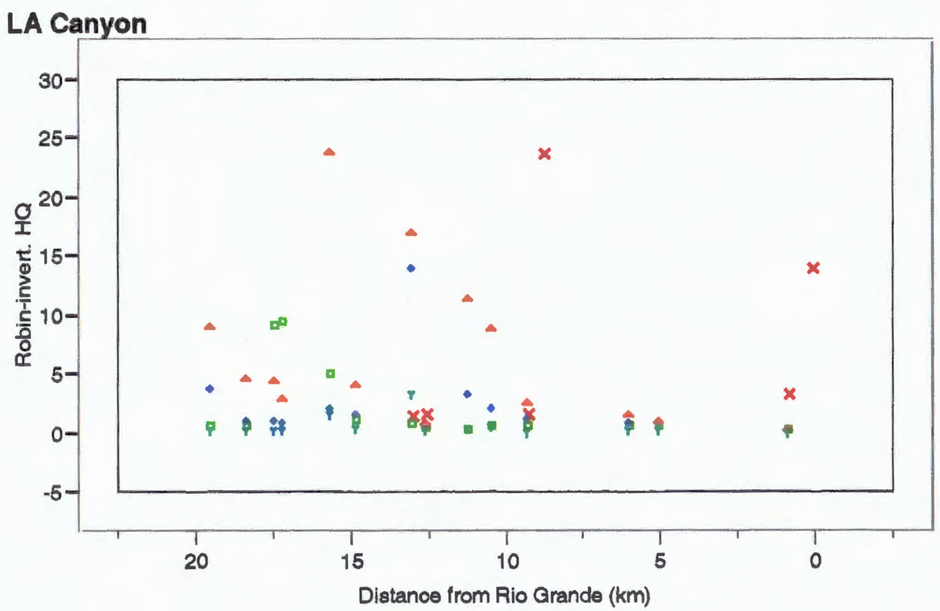


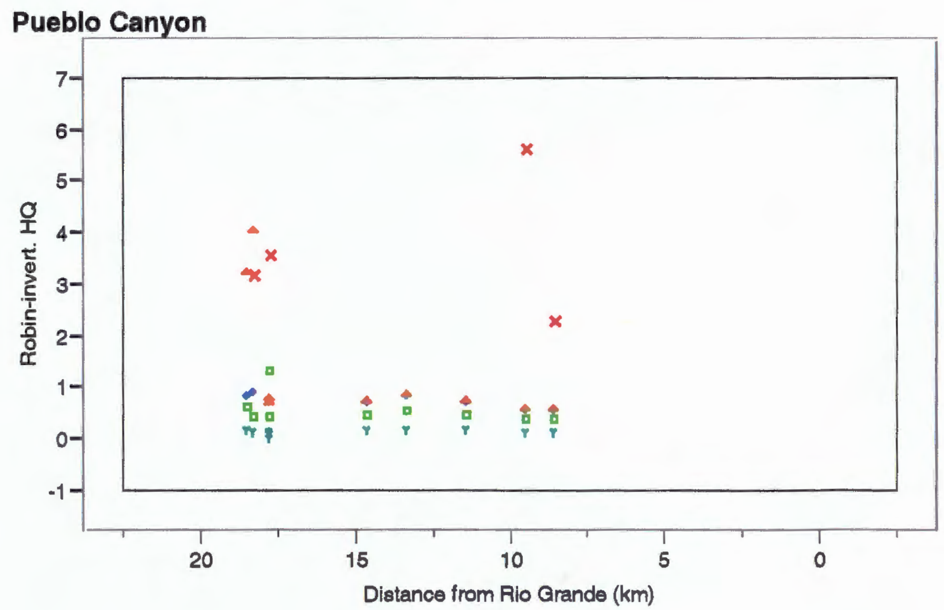
Oneway Analysis of Zinc (mg/kg) By Canyon-date



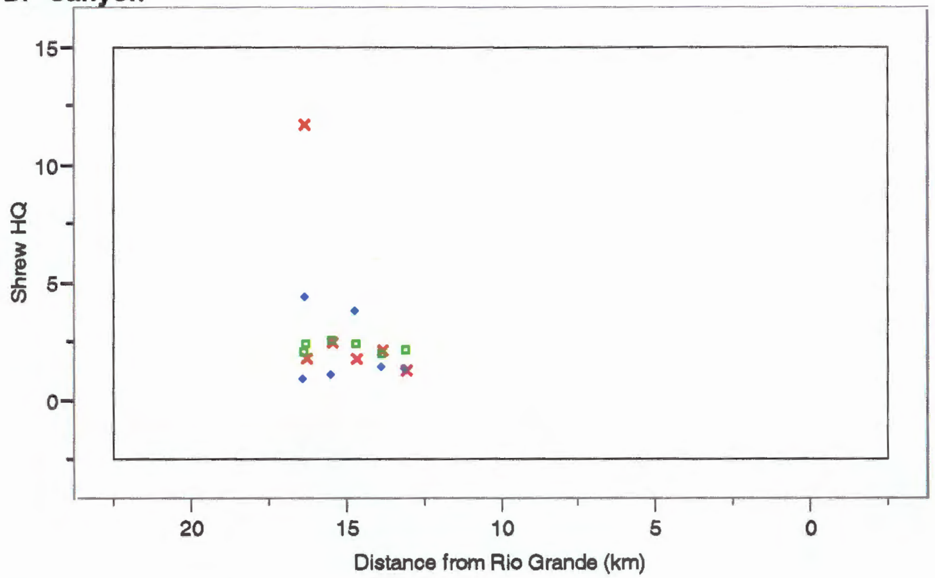

DP Canyon
Robin-invert. HQ
30
25
20
15
10
5
0
-5
20
15
10
5
0
Distance from Rio Grande (km)


Acid Canyon
Robin-invert. HQ
30
25
20
15
10
5
0
-5
20
15
10
5
0
Distance from Rio Grande (km)
Y
Cyanide__Total HQ
Aroclor_1254 HQ
DDE_4_4___HQ
DDT_4_4___HQ
Endrin_Aldehyde HQ

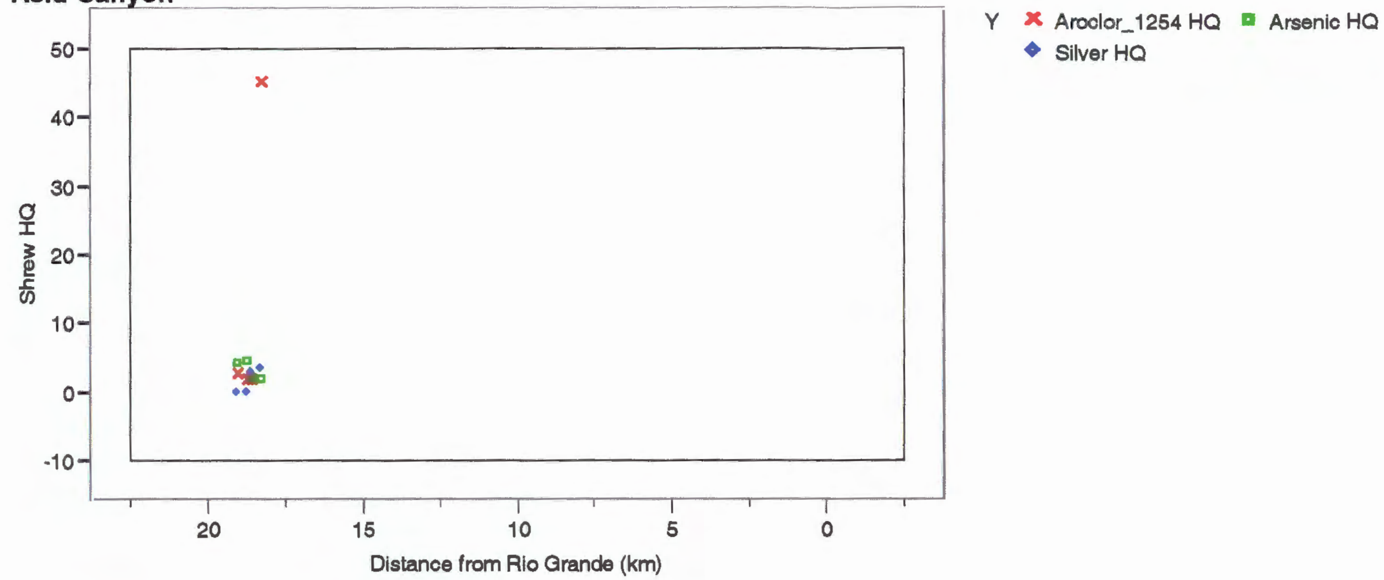

LA Canyon
Robin-invert. HQ
30
25
20
15
10
5
0
-5
20
15
10
5
0
Distance from Rio Grande (km)


Pueblo Canyon
Robin-invert. HQ
7
6
5
4
3
2
1
0
-1
20
15
10
5
0
Distance from Rio Grande (km)

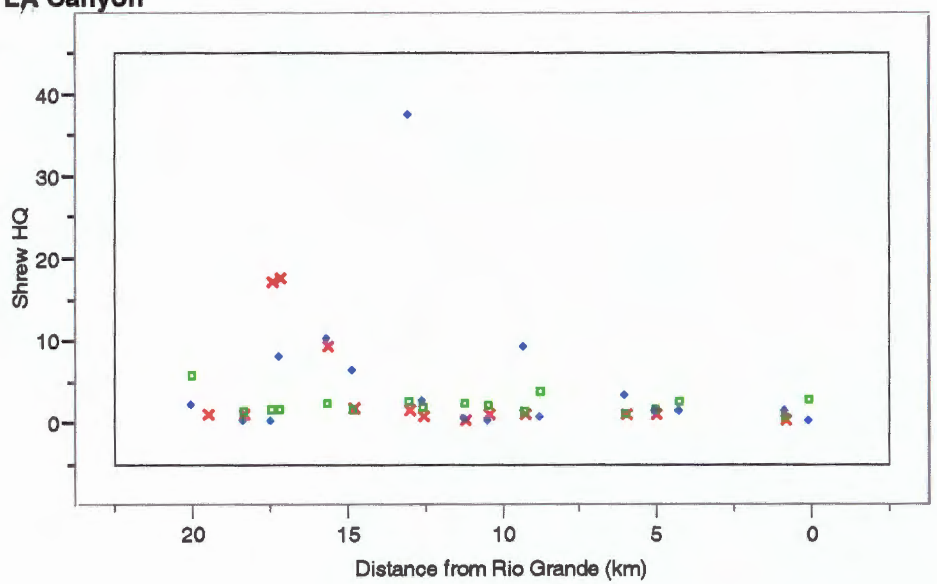
DP Canyon



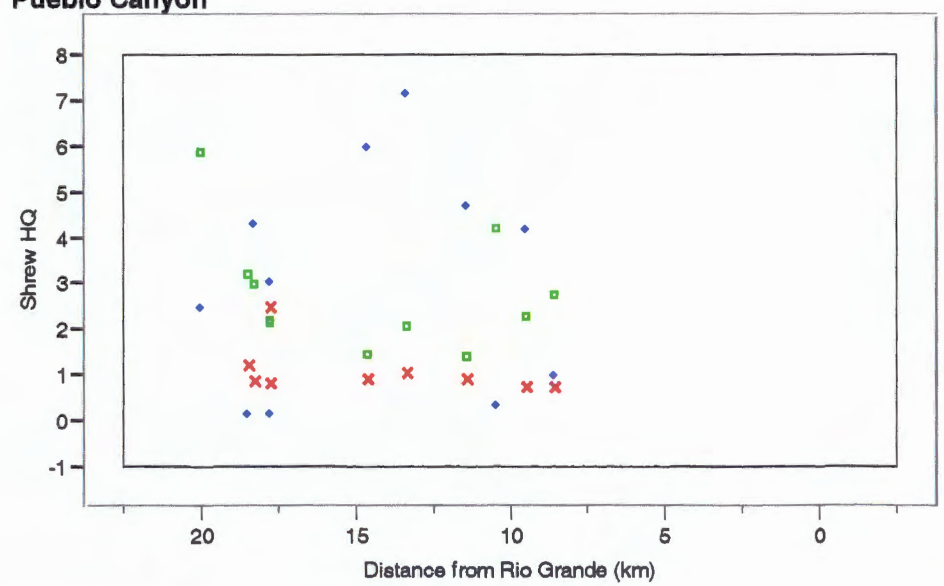
Acid Canyon



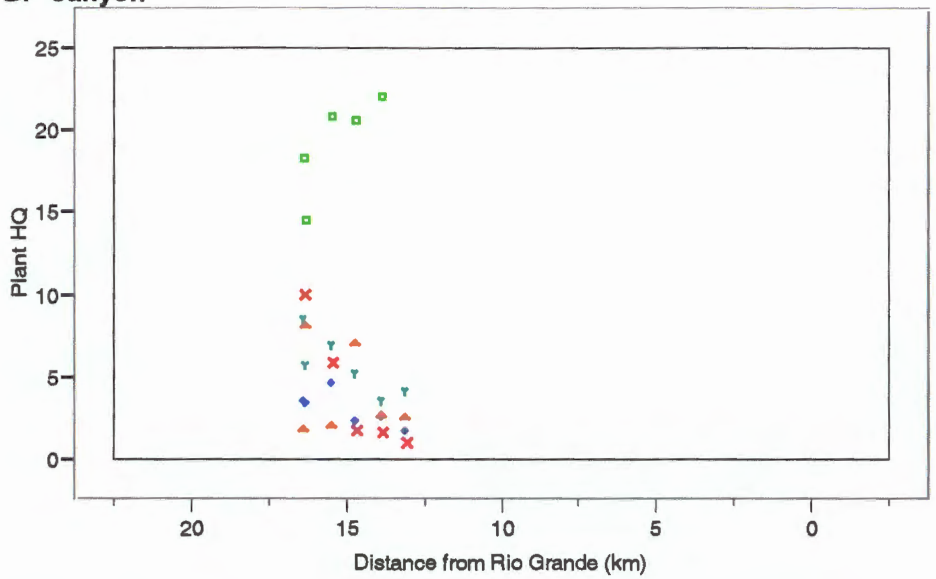
LA Canyon



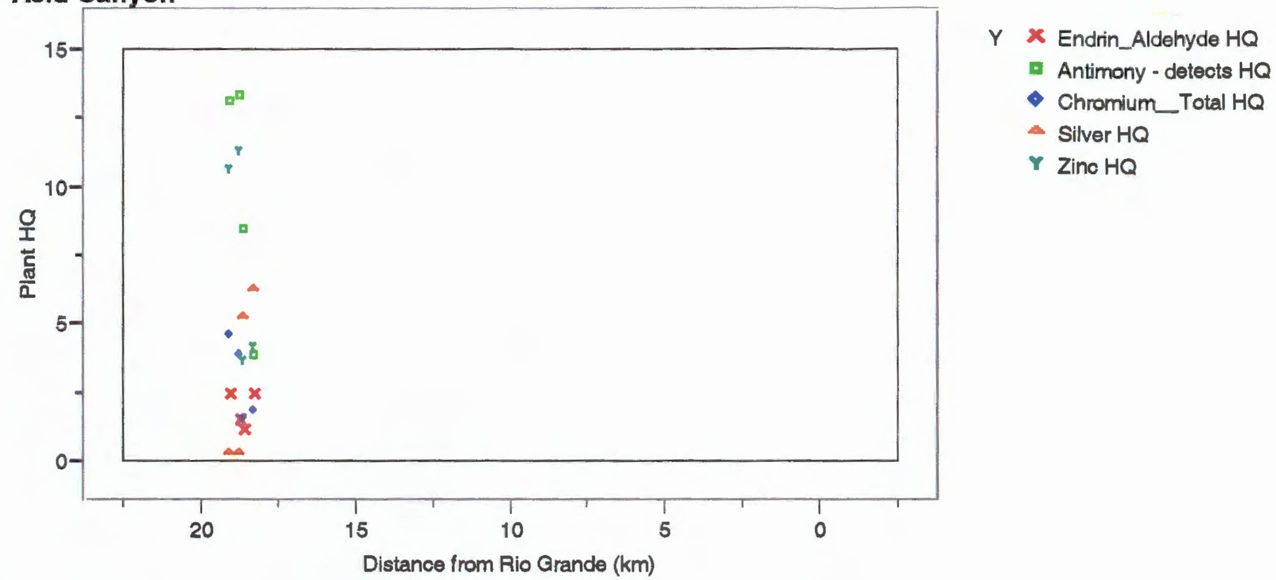
Pueblo Canyon



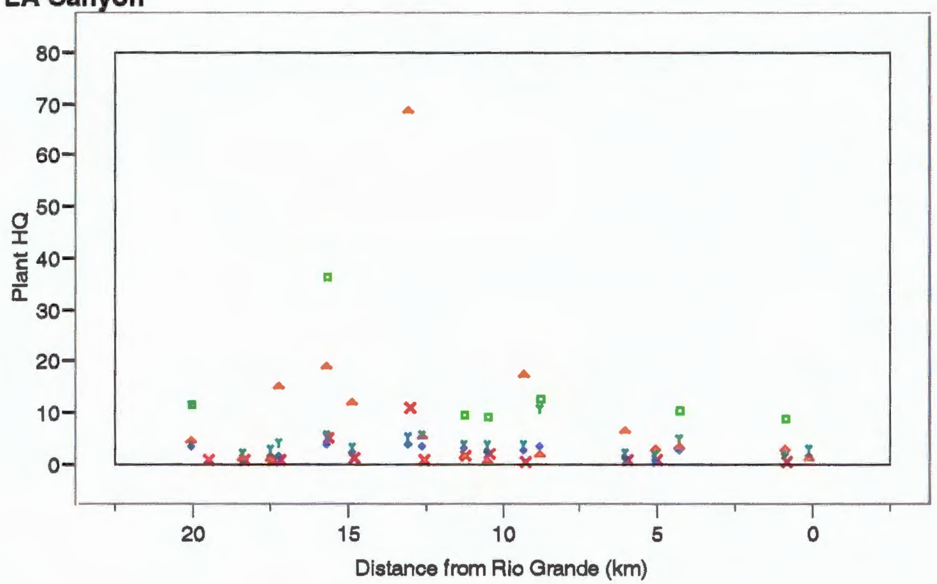
DP Canyon



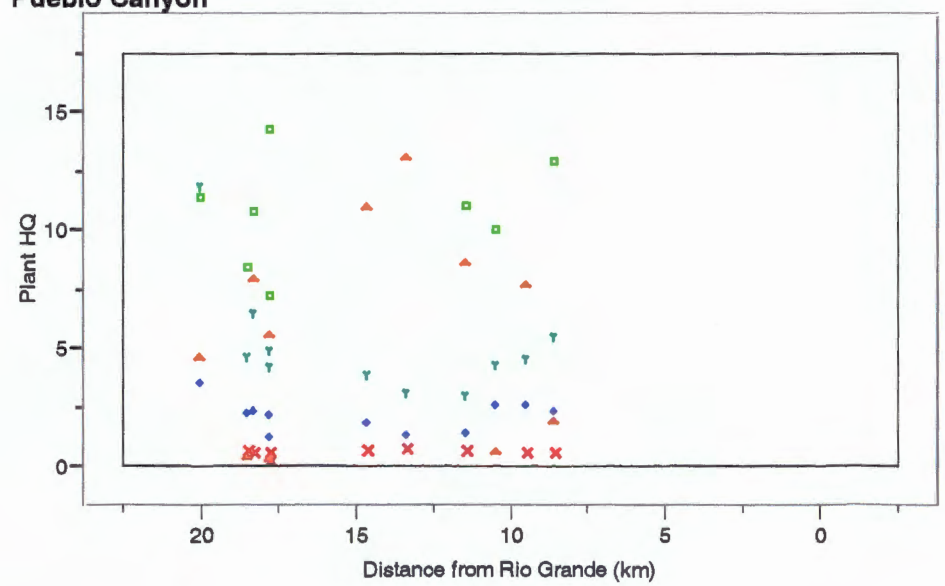
Acid Canyon



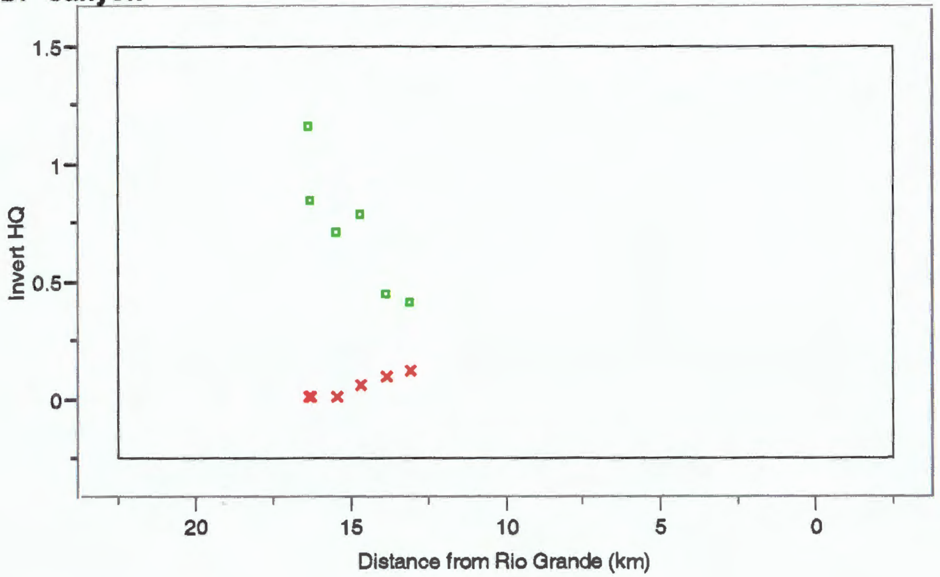
LA Canyon



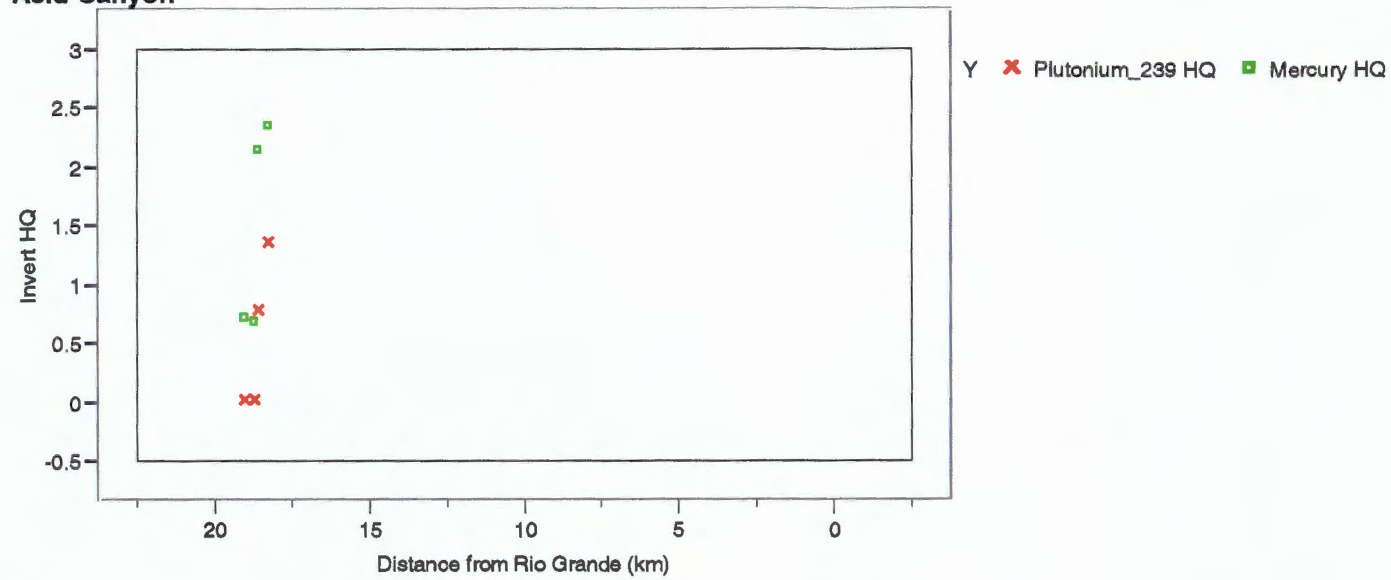
Pueblo Canyon



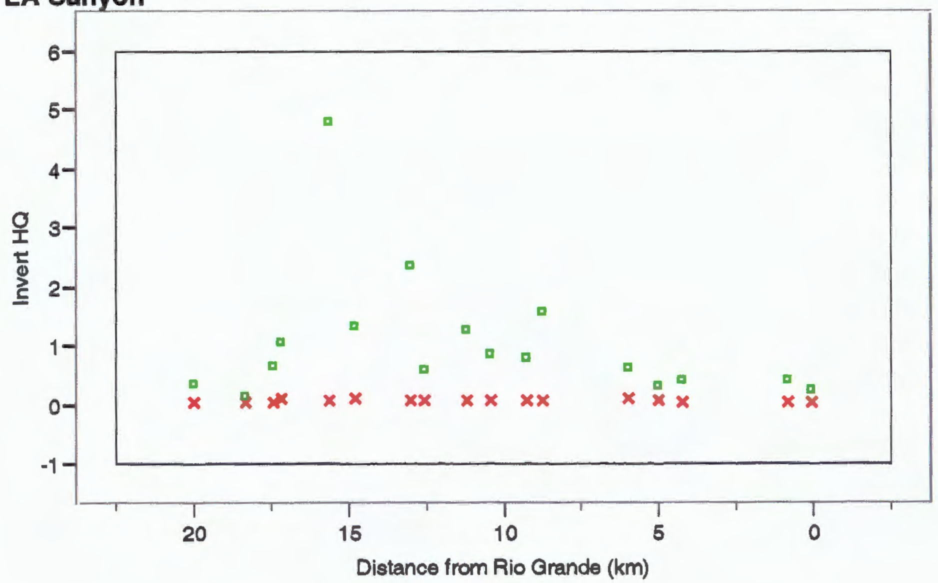
DP Canyon



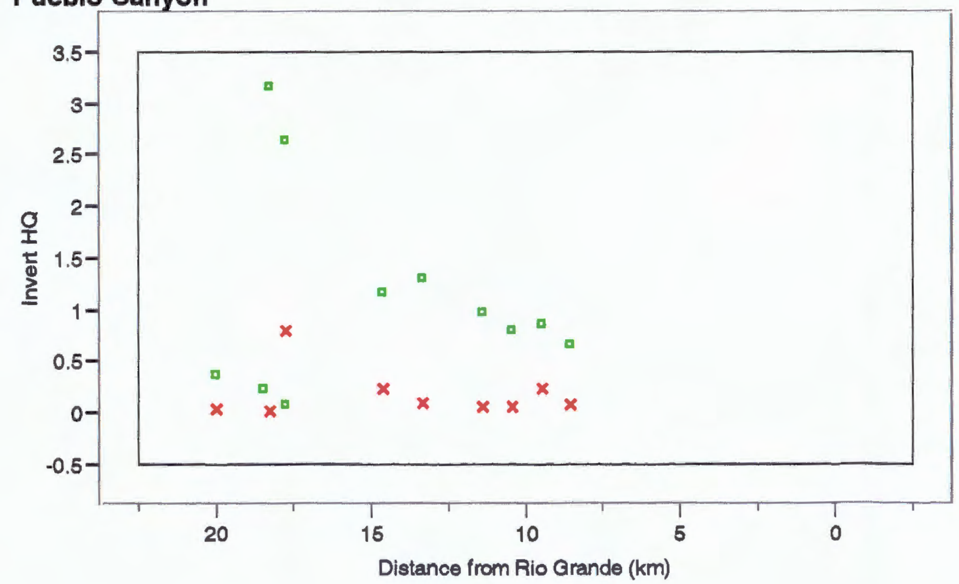
Acid Canyon



LA Canyon



Pueblo Canyon



4/23/02
DRAFT LAPSAR potential contaminant grouping

Constituent	Canyon	Group	Receptor Used as Basis of Grouping
Naphthalene	LA & DP	3	Robin
	Acid & Pueblo	3	Robin
Nap detects	LA & DP	3	Robin
	Acid & Pueblo	3	Robin
Plu-239	LA & DP	4	
	Acid & Pueblo	2	Invert
Selenium	LA & DP	3	Plant
	Acid & Pueblo	3	Plant
silver	LA & DP	2	Shrew
	Acid & Pueblo	2	Shrew, plant
Thallium	LA & DP	4	
	Acid & Pueblo	3	Plant, shrew
Titanium	LA & DP	4	
	Acid & Pueblo	2	Shrew
Zinc	LA & DP	3	Plant
	Acid & Pueblo	2	Plant

4/23/02
DRAFT LAPSAR potential contaminant grouping

This table groups each potential contaminant for each canyon system into 4 groups based on a visual inspection of the ecological HQ versus distance for the 4 receptors considered. The groups are:

- Group 1: high HQs occur over most of the canyon
- Group 2: high HQs occur at particular spots within canyon
- Group 3: lower but still elevated HQs occur over most of the canyon
- Group 4: HQs are close to target hazard goal or background HQ throughout canyon; therefore this constituent is unlikely to be a risk driver

Table of HQ Analysis of LAPSAR Potential Contaminants

Constituent	Canyon	Group	Receptor Used as Basis of Grouping
Antimony	LA & DP	1	Plant
	Acid & Pueblo	3	Plant
Antimony (detects)	LA & DP	2	Plant
	Acid & Pueblo	2	Plant
Aroclor-1254	LA & DP	2	Shrew, robin
	Acid & Pueblo	2	Shrew, robin
arsenic	LA & DP	3	Shrew
	Acid & Pueblo	2	Shrew
Barium	LA & DP	Replot w/o highest HQ	
	Acid & Pueblo		
Cadmium	LA & DP	4	
	Acid & Pueblo	4	
Chromium VI/III=1/6	LA & DP	1	plant, invert
	Acid & Pueblo	2	plant, invert
Cobalt	LA & DP	1	Robin, shrew
	Acid & Pueblo	1	Robin
Cyanide	LA & DP	Too few samples	Robin
	Acid & Pueblo		Robin
DDE	LA & DP	2	Robin
	Acid & Pueblo	2	Robin
DDT	LA & DP	2	Robin
	Acid & Pueblo	2	Robin
Endrin ald.	LA & DP	2	Plant, robin
	Acid & Pueblo	2	Plant, robin
Manganese	LA & DP	3	Plant
	Acid & Pueblo	3	Plant
Mercury	LA & DP	2	Invert
	Acid & Pueblo	2	Invert

SubReach	Distance from Rio Grande	Cyanide__Total HQ	Americium_241_GS HQ	Plutonium_239 HQ	Aroclor_1254 HQ	Aroclor_1260 HQ	DDE_4_4__HQ	DDT_4_4__HQ	Endrin_Aldehyde HQ	Acenaphthene HQ	Bis_2_ethylhexyl_phthalate HQ	Chrysene HQ	Naphthalene HQ	Antimony HQ	Antimony - detects HQ	Arsenic HQ	Barium HQ	Cadmium HQ	Chromium__Total HQ	Cobalt HQ	Copper HQ	Lead HQ	Manganese HQ	Mercury HQ	Selenium HQ	Silver HQ	Thallium HQ	Zinc HQ	Methylmercury_1_Ion HQ	Titanium HQ	Total_Uranium_by_I CPMS HQ	Uranium HQ	HI -all	HI - w/o Ba,Co,Mn
ESL		n/a	21000	160000	10	n/a	n/a	3.7	0.0034	0.25	n/a	n/a	n/a	0.05	0.05	10	100	1	2.4	0.25	10	450	50	34	0.1	0.05	0.1	10	n/a	n/a	25	25		
DP-1W	16.4	n/a	0.00	0.00	0.03	n/a	n/a	0.02	9.90	7.57	n/a	n/a	n/a	11.03	18.27	0.17	0.66	0.19	3.61	10.97	1.05	0.16	3.68	0.00	4.46	1.73	3.30	8.55	n/a	n/a	nd	nd	85	52
DP-1C	16.3	n/a	0.00	0.00	0.00	n/a	n/a	nd	nd	3.34	n/a	n/a	n/a	7.14	14.47	0.19	0.56	0.12	3.51	10.77	0.83	0.12	5.07	0.00	2.30	8.02	2.13	5.82	n/a	n/a	nd	nd	64	34
DP-1E	15.5	n/a	0.00	0.00	0.01	n/a	n/a	0.01	5.74	5.03	n/a	n/a	n/a	10.17	20.80	0.22	0.56	0.21	4.66	10.01	0.88	0.21	4.87	0.00	3.38	2.04	3.22	7.03	n/a	n/a	nd	nd	79	43
DP-2	14.7	n/a	0.00	0.00	0.00	n/a	n/a	0.01	1.67	1.80	n/a	n/a	n/a	34.67	20.60	0.20	0.65	0.17	2.32	12.88	0.83	0.09	5.99	0.00	4.03	7.03	2.62	5.27	n/a	n/a	nd	nd	101	61
DP-3	13.8	n/a	0.00	0.00	0.00	n/a	n/a	0.00	1.52	3.27	n/a	n/a	n/a	8.33	22.00	0.16	0.49	0.12	2.60	10.36	0.46	0.08	3.84	0.00	3.37	2.65	3.29	3.61	n/a	n/a	nd	nd	66	29
DP-4	13.1	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.93	4.56	n/a	n/a	n/a	11.26	nd	0.18	0.50	0.05	1.73	8.81	1.23	0.07	4.64	0.00	2.83	2.45	2.46	4.13	n/a	n/a	nd	0.27	46	32
LA-0	19.5	n/a	nd	nd	0.00	n/a	n/a	0.01	0.56	2.54	n/a	n/a	n/a	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	n/a	n/a	nd	nd	3	3
LA-1FW	18.4	n/a	nd	0.00	0.00	n/a	n/a	0.00	0.56	2.50	n/a	n/a	n/a	4.20	nd	0.13	0.36	0.01	1.05	6.77	0.88	0.05	3.51	0.00	3.33	0.87	1.58	2.66	n/a	n/a	nd	nd	28	18
LA-1W+	17.5	n/a	nd	0.00	0.04	n/a	n/a	0.00	0.58	0.79	n/a	n/a	n/a	4.02	nd	0.15	0.53	0.01	1.87	8.57	0.77	0.07	4.00	0.00	3.09	0.84	1.54	3.42	n/a	n/a	nd	nd	30	17
LA-1W	17.2	n/a	nd	0.00	0.04	n/a	n/a	0.00	0.60	0.79	n/a	n/a	n/a	56.58	nd	0.15	0.64	0.24	1.85	11.70	0.88	0.08	5.08	0.00	3.02	14.78	1.29	4.27	n/a	n/a	nd	nd	102	85
LA-1C	15.7	n/a	0.00	0.00	0.02	n/a	n/a	0.02	4.85	1.59	n/a	n/a	n/a	45.87	36.26	0.20	0.45	0.14	4.07	7.68	0.65	0.04	4.04	0.01	2.99	18.74	0.87	5.90	n/a	n/a	0.05	nd	134	86
LA-1E	14.8	n/a	nd	0.00	0.00	n/a	n/a	0.00	0.91	0.82	n/a	n/a	n/a	43.35	nd	0.14	0.85	0.19	2.64	11.20	1.31	0.04	4.92	0.00	3.56	11.97	1.35	3.58	n/a	n/a	nd	nd	87	70
LA-2W	13.0	n/a	0.00	0.00	0.00	n/a	n/a	0.01	10.72	0.79	n/a	n/a	n/a	45.32	nd	0.21	0.60	0.12	4.20	8.96	0.77	0.06	5.33	0.00	3.73	68.58	2.59	5.44	n/a	n/a	nd	0.19	158	143
LA-2E	12.6	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.47	0.73	n/a	n/a	n/a	64.17	nd	0.16	0.53	0.23	3.54	7.60	0.59	0.07	5.51	0.00	3.00	5.33	1.63	5.95	n/a	n/a	nd	0.21	100	86
LA-2FE	11.2	n/a	0.00	0.00	0.00	n/a	n/a	0.01	1.26	0.70	n/a	n/a	n/a	9.70	9.70	0.21	0.63	0.15	3.44	10.07	0.70	0.06	5.50	0.00	4.35	1.37	1.06	4.02	n/a	n/a	nd	nd	53	27
LA-3W	10.5	n/a	0.00	0.00	0.00	n/a	n/a	0.01	1.60	0.84	n/a	n/a	n/a	6.95	9.05	0.18	0.54	0.09	2.57	8.87	0.64	0.05	4.80	0.00	2.18	0.75	1.18	4.18	n/a	n/a	nd	nd	44	21
LA-3	9.3	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.30	1.65	n/a	n/a	n/a	59.00	nd	0.12	0.53	0.24	2.73	10.30	0.79	0.06	5.02	0.00	1.33	17.38	0.84	4.22	n/a	n/a	nd	0.17	105	89
LA-3E	8.8	n/a	0.00	0.00	nd	n/a	n/a	nd	nd	1.02	n/a	n/a	n/a	7.53	12.80	0.32	2.77	0.47	3.88	26.20	1.91	0.09	29.75	0.00	12.20	1.65	4.49	11.09	n/a	n/a	nd	nd	116	45
LA-4W	6.0	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.60	nd	n/a	n/a	n/a	41.44	nd	0.10	0.53	0.21	1.53	8.88	0.81	0.05	4.04	0.00	1.62	6.54	1.62	2.60	n/a	n/a	nd	nd	71	57
LA-4E	5.0	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.59	nd	n/a	n/a	n/a	24.59	nd	0.13	0.53	0.11	1.15	9.05	0.55	0.02	4.36	0.00	2.31	2.97	2.55	2.13	n/a	n/a	nd	nd	51	37
LA-4FE	4.3	n/a	0.00	0.00	nd	n/a	n/a	nd	nd	nd	n/a	n/a	n/a	7.69	10.24	0.22	1.27	0.02	2.79	18.65	1.11	0.04	10.70	0.00	2.34	3.24	1.99	5.29	n/a	n/a	nd	nd	66	25
LA-5	0.9	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.10	0.76	n/a	n/a	n/a	49.29	8.88	0.06	0.67	0.17	1.98	8.72	0.41	0.02	3.62	0.00	2.26	2.96	1.50	2.16	n/a	n/a	nd	0.14	84	62
LA-5E	0.1	n/a	0.00	0.00	nd	n/a	n/a	nd	nd	nd	n/a	n/a	n/a	7.95	nd	0.23	1.48	0.21	1.83	15.63	0.84	0.04	12.57	0.00	5.90	0.80	2.55	3.41	n/a	n/a	nd	nd	53	24
Baseline	20.0	n/a	0.00	0.00	nd	n/a	n/a	nd	nd	1.24	n/a	n/a	n/a	9.79	11.36	0.48	6.49	0.69	3.55	25.09	2.63	0.12	72.00	0.00	17.26	4.52	10.38	11.84	n/a	n/a	nd	nd	177	62
AC-1	19.1	n/a	0.00	0.00	0.01	n/a	n/a	0.01	2.40	2.32	n/a	n/a	n/a	9.72	13.05	0.35	0.85	0.05	4.65	18.47	1.06	0.19	8.07	0.00	6.40	0.28	2.42	10.69	n/a	n/a	nd	nd	81	41
AC-2	18.8	n/a	0.00	0.00	0.00	n/a	n/a	0.01	1.44	2.03	n/a	n/a	n/a	10.29	13.32	0.36	0.79	0.04	3.89	20.11	0.95	0.21	8.39	0.00	5.59	0.28	2.41	11.30	n/a	n/a	nd	nd	81	39
ACS	18.6	n/a	0.00	0.00	0.00	n/a	n/a	0.01	1.08	1.64	n/a	n/a	n/a	5.02	8.40	0.17	0.26	0.25	1.55	6.54	0.85	0.13	3.24	0.00	2.42	5.20	1.13	3.66	n/a	n/a	nd	nd	42	23
AC-3	18.3	n/a	0.00	0.00	0.10	n/a	n/a	0.01	2.36	0.96	n/a	n/a	n/a	8.53	3.85	0.15	0.43	0.42	1.87	9.37	0.69	0.08	4.92	0.00	3.88	6.20	2.10	4.21	n/a	n/a	nd	0.11	50	32
P-1FW	18.5	n/a	nd	nd	0.00	n/a	n/a	0.00	0.59	0.81	n/a	n/a	n/a	4.55	8.40	0.26	0.68	0.01	2.24	16.13	0.72	0.06	8.23	0.00	3.83	0.30	3.93	4.65	n/a	n/a	nd	nd	55	22
P-1W	18.3	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.51	0.70	n/a	n/a	n/a	10.13	10.72	0.25	0.98	0.21	2.31	12.40	1.22	0.09	10.27	0.00	4.64	7.82	2.13	6.52	n/a	n/a	nd	0.16	71	37
P-1E	17.8	n/a	0.00	0.00	0.01	n/a	n/a	0.00	0.10	0.64	n/a	n/a	n/a	19.69	14.20	0.18	0.67	0.28	2.15	11.00	0.73	0.07	7.69	0.00	3.91	5.50	1.77	4.85	n/a	n/a	nd	0.31	74	40
WC	17.8	n/a	nd	nd	0.00	n/a	n/a	0.00	0.50	0.68	n/a	n/a	n/a	3.82	7.20	0.18	0.38	0.01	1.22	10.53	0.43	0.04	6.40	0.00	2.13	0.25	5.76	4.17	n/a	n/a	nd	nd	44	19
P-2W	14.6	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.55	nd	n/a	n/a	n/a	7.96	nd	0.12	0.88	0.25	1.84	12.85	0.92	0.04	8.67	0.00	5.05	10.88	3.39	3.83	n/a	n/a	nd	nd	57	35
P-2E	13.3	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.63	nd	n/a	n/a	n/a	6.40	nd	0.17	0.51	0.32	1.33	10.00	1.04	0.02	4.78	0.00	3.20	13.00	6.50	3.09	n/a	n/a	nd	nd	51	36
P-3W	11.4	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.57	nd	n/a	n/a	n/a	6.31	11.00	0.12	0.61	0.22	1.43	9.61	0.86	0.03	6.47	0.00	4.34	8.55	4.42	3.00	n/a	n/a	nd	nd	58	30
P-3E	10.4	n/a	0.00	0.00	nd	n/a	n/a	nd	nd	nd	n/a	n/a	n/a	5.28	10.00	0.35	1.61	0.14	2.61	19.40	1.01	0.05	15.50	0.00	8.05	0.57	1.55	4.25	n/a	n/a	nd	nd	70	24
P-4W	9.5	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.44	0.73	n/a	n/a	n/a	24.50	nd	0.19	0.71	0.24	2.63	11.84	0.73	0.03	6.58	0.00	1.28	7.60	4.88	4.57	n/a	n/a	nd	0.17	67	48
P-4E	8.6	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.45	0.67	n/a	n/a	n/a	10.34	12.83	0.23	1.12	0.13	2.37	14.21	0.72	0.04	12.62	0.00	5.15	1.79	7.82	5.46	n/a	n/a	nd	0.13	76	35
?		n/a	nd	nd	nd	n/a	n/a	nd	nd	nd	n/a	n/a	n/a	13.00	nd	0.11	1.41	0.25	3.04	23.20	1.05	0.05	13.18	0.00	3.40	nd	13.00	4.43	n/a	n/a	nd	nd	76	38

n/a = ESL not available
nd = no data for subreach

SubReach	Distance from Rio Grande	Cyanide_Total HQ	Americium_241_GS HQ	Plutonium_239 HQ	Aroclor_1254 HQ	Aroclor_1260 HQ	DDE_4_4__HQ	DDT_4_4__HQ	Endrin_Aldehyde HQ	Acenaphthene HQ	Bis_2_ethylhexyl_phthalate HQ	Chrysene HQ	Naphthalene HQ	Antimony HQ	Antimony - detects HQ	Arsenic HQ	Barium HQ	Cadmium HQ	Chromium_Total HQ	Cobalt HQ	Copper HQ	Lead HQ	Manganese HQ	Mercury HQ	Selenium HQ	Silver HQ	Thallium HQ	Zinc HQ	Methylmercury_1_Ion HQ	Titanium HQ	Total_Uranium_by_ICPMS HQ	Uranium HQ	HI -all	HI - w/o Ba,Co,Mn
ESL		n/a	44	47	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.8	n/a	0.1	1.4	n/a	13	2000	n/a	0.05	7.7	n/a	n/a	350	2.5	n/a	n/a	n/a		
DP-1W	16.4	n/a	0.00	0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.25	n/a	1.91	6.19	n/a	0.81	0.04	n/a	1.16	0.06	n/a	n/a	0.24	nd	n/a	n/a	n/a	11	11
DP-1C	16.3	n/a	0.00	0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.29	n/a	1.16	6.02	n/a	0.64	0.03	n/a	0.84	0.03	n/a	n/a	0.17	nd	n/a	n/a	n/a	9	9
DP-1E	15.5	n/a	0.00	0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.32	n/a	2.14	7.98	n/a	0.67	0.05	n/a	0.70	0.04	n/a	n/a	0.20	nd	n/a	n/a	n/a	12	12
DP-2	14.7	n/a	0.10	0.06	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.29	n/a	1.72	3.98	n/a	0.63	0.02	n/a	0.79	0.05	n/a	n/a	0.15	nd	n/a	n/a	n/a	8	8
DP-3	13.8	n/a	0.25	0.09	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.24	n/a	1.25	4.45	n/a	0.35	0.02	n/a	0.44	0.04	n/a	n/a	0.10	nd	n/a	n/a	n/a	7	7
DP-4	13.1	n/a	0.11	0.11	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.26	n/a	0.48	2.97	n/a	0.95	0.02	n/a	0.41	0.04	n/a	n/a	0.12	nd	n/a	n/a	n/a	5	5
LA-0	19.5	n/a	nd	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	nd	n/a	nd	nd	n/a	nd	nd	n/a	nd	nd	n/a	n/a	nd	nd	n/a	n/a	n/a	0	0
LA-1FW	18.4	n/a	nd	0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.19	n/a	0.12	1.80	n/a	0.67	0.01	n/a	0.13	0.04	n/a	n/a	0.08	nd	n/a	n/a	n/a	3	3
LA-1W+	17.5	n/a	nd	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.21	n/a	0.12	3.20	n/a	0.59	0.01	n/a	0.66	0.04	n/a	n/a	0.10	nd	n/a	n/a	n/a	5	5
LA-1W	17.2	n/a	nd	0.08	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.21	n/a	2.43	3.17	n/a	0.68	0.02	n/a	1.06	0.04	n/a	n/a	0.12	nd	n/a	n/a	n/a	8	8
LA-1C	15.7	n/a	0.00	0.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.30	n/a	1.42	6.97	n/a	0.50	0.01	n/a	4.81	0.04	n/a	n/a	0.17	nd	n/a	n/a	n/a	14	14
LA-1E	14.8	n/a	nd	0.06	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.21	n/a	1.90	4.52	n/a	1.01	0.01	n/a	1.33	0.05	n/a	n/a	0.10	nd	n/a	n/a	n/a	9	9
LA-2W	13.0	n/a	0.00	0.04	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.31	n/a	1.18	7.20	n/a	0.59	0.01	n/a	2.36	0.05	n/a	n/a	0.16	nd	n/a	n/a	n/a	12	12
LA-2E	12.6	n/a	0.13	0.04	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.24	n/a	2.32	6.07	n/a	0.46	0.01	n/a	0.57	0.04	n/a	n/a	0.17	nd	n/a	n/a	n/a	10	10
LA-2FE	11.2	n/a	0.03	0.04	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.31	n/a	1.53	5.89	n/a	0.54	0.01	n/a	1.26	0.06	n/a	n/a	0.11	nd	n/a	n/a	n/a	10	10
LA-3W	10.5	n/a	0.03	0.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.26	n/a	0.91	4.40	n/a	0.49	0.01	n/a	0.85	0.03	n/a	n/a	0.12	nd	n/a	n/a	n/a	7	7
LA-3	9.3	n/a	0.03	0.02	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.17	n/a	2.44	4.68	n/a	0.61	0.01	n/a	0.79	0.02	n/a	n/a	0.12	nd	n/a	n/a	n/a	9	9
LA-3E	8.8	n/a	0.01	0.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.46	n/a	4.68	6.64	n/a	1.47	0.02	n/a	1.56	0.16	n/a	n/a	0.32	nd	n/a	n/a	n/a	15	15
LA-4W	6.0	n/a	0.01	0.07	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.15	n/a	2.13	2.61	n/a	0.62	0.01	n/a	0.61	0.02	n/a	n/a	0.07	nd	n/a	n/a	n/a	6	6
LA-4E	5.0	n/a	0.00	0.02	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.19	n/a	1.12	1.96	n/a	0.43	0.00	n/a	0.30	0.03	n/a	n/a	0.06	nd	n/a	n/a	n/a	4	4
LA-4FE	4.3	n/a	0.00	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.32	n/a	0.22	4.79	n/a	0.85	0.01	n/a	0.42	0.03	n/a	n/a	0.15	nd	n/a	n/a	n/a	7	7
LA-5	0.9	n/a	0.00	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.09	n/a	1.73	3.40	n/a	0.32	0.00	n/a	0.40	0.03	n/a	n/a	0.06	nd	n/a	n/a	n/a	6	6
LA-5E	0.1	n/a	0.00	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.34	n/a	2.07	3.14	n/a	0.64	0.01	n/a	0.25	0.08	n/a	n/a	0.10	nd	n/a	n/a	n/a	7	7
Baseline	20.0	n/a	0.01	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.71	n/a	6.89	6.09	n/a	2.02	0.03	n/a	0.36	0.22	n/a	n/a	0.34	nd	n/a	n/a	n/a	17	17
AC-1	19.1	n/a	0.01	0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.51	n/a	0.55	7.98	n/a	0.81	0.04	n/a	0.72	0.08	n/a	n/a	0.31	nd	n/a	n/a	n/a	11	11
AC-2	18.8	n/a	0.00	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.53	n/a	0.45	6.67	n/a	0.73	0.05	n/a	0.68	0.07	n/a	n/a	0.32	nd	n/a	n/a	n/a	10	10
ACS	18.6	n/a	0.01	0.77	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.25	n/a	2.50	2.66	n/a	0.66	0.03	n/a	2.14	0.03	n/a	n/a	0.10	0.00	n/a	n/a	n/a	9	9
AC-3	18.3	n/a	0.32	1.34	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.23	n/a	4.21	3.21	n/a	0.53	0.02	n/a	2.34	0.05	n/a	n/a	0.12	nd	n/a	n/a	n/a	12	12
P-1FW	18.5	n/a	nd	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.39	n/a	0.11	3.85	n/a	0.55	0.01	n/a	0.23	0.05	n/a	n/a	0.13	nd	n/a	n/a	n/a	5	5
P-1W	18.3	n/a	0.00	0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.36	n/a	2.12	3.96	n/a	0.94	0.02	n/a	3.16	0.06	n/a	n/a	0.19	0.00	n/a	n/a	n/a	11	11
P-1E	17.8	n/a	0.01	0.78	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.27	n/a	2.77	3.69	n/a	0.56	0.01	n/a	2.64	0.05	n/a	n/a	0.14	0.00	n/a	n/a	n/a	11	11
WC	17.8	n/a	nd	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.26	n/a	0.09	2.08	n/a	0.33	0.01	n/a	0.08	0.03	n/a	n/a	0.12	nd	n/a	n/a	n/a	3	3
P-2W	14.6	n/a	0.01	0.21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.17	n/a	2.45	3.16	n/a	0.71	0.01	n/a	1.15	0.07	n/a	n/a	0.11	nd	n/a	n/a	n/a	8	8
P-2E	13.3	n/a	0.02	0.07	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.25	n/a	3.20	2.29	n/a	0.80	0.00	n/a	1.30	0.04	n/a	n/a	0.09	nd	n/a	n/a	n/a	8	8
P-3W	11.4	n/a	0.00	0.04	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.17	n/a	2.23	2.45	n/a	0.66	0.01	n/a	0.97	0.06	n/a	n/a	0.09	nd	n/a	n/a	n/a	7	7
P-3E	10.4	n/a	0.00	0.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.51	n/a	1.36	4.48	n/a	0.78	0.01	n/a	0.79	0.10	n/a	n/a	0.12	nd	n/a	n/a	n/a	8	8
P-4W	9.5	n/a	0.02	0.20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.27	n/a	2.42	4.51	n/a	0.56	0.01	n/a	0.85	0.02	n/a	n/a	0.13	nd	n/a	n/a	n/a	9	9
P-4E	8.6	n/a	0.00	0.06	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.33	n/a	1.27	4.05	n/a	0.55	0.01	n/a	0.66	0.07	n/a	n/a	0.16	nd	n/a	n/a	n/a	7	7
?		n/a	nd	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.16	n/a	2.50	5.21	n/a	0.81	0.01	n/a	1.20	0.04	n/a	n/a	0.13	nd	n/a	n/a	n/a	10	10

n/a = ESL not available
nd = no data for subreach

SubReach	Distance from Rio Grande	Cyanide__Total HQ	Americium_241_GS HQ	Plutonium__239 HQ	Aroclor_1254 HQ	Aroclor_1260 HQ	DDE_4_4__HQ	DDT_4_4__HQ	Endrin_Aldehyde HQ	Acenaphthene HQ	Bis_2_ethylhexyl_pl thalate HQ	Chrysene HQ	Naphthalene HQ	Antimony HQ	Antimony - detects HQ	Arsenic HQ	Barium HQ	Cadmium HQ	Chromium__Total HQ	Cobalt HQ	Copper HQ	Lead HQ	Manganese HQ	Mercury HQ	Selenium HQ	Silver HQ	Thallium HQ	Zinc HQ	Methylmercury_1_Ion HQ	Titanium HQ	Total_Uranium_by_I CPMS HQ	Uranium HQ	HI -all	HI - w/o Ba,Co,Mn	HI - PCB
ESL		310	31000	110000	0.022	5	6.6	1	0.19	160	30	2.4	120	0.57	0.57	0.83	2.4	0.87	700	0.091	170	100	520	190	0.91	0.091	0.32	230	0.003	72	27	27			
DP-1W	16.4	nd	0.00	0.00	11.68	0.05	0.01	0.06	0.18	0.01	0.04	0.51	0.01	0.97	1.60	2.06	27.46	0.22	0.01	30.14	0.06	0.74	0.35	0.00	0.49	0.95	1.03	0.37	nd	nd	nd	nd	79	19	12
DP-1C	16.3	nd	0.00	0.00	1.71	0.03	nd	nd	nd	0.01	0.02	0.31	0.01	0.63	1.27	2.35	23.13	0.13	0.01	29.57	0.05	0.55	0.49	0.00	0.25	4.41	0.67	0.25	nd	nd	nd	nd	66	11	2
DP-1E	15.5	nd	0.00	0.00	2.38	0.02	0.00	0.02	0.10	0.01	0.03	0.41	0.01	0.89	1.82	2.59	23.21	0.25	0.02	27.50	0.05	0.97	0.47	0.00	0.37	1.12	1.01	0.31	nd	nd	nd	nd	64	11	3
DP-2	14.7	nd	0.00	0.00	1.68	0.02	0.00	0.04	0.03	0.00	0.02	0.16	0.00	3.04	1.81	2.36	27.25	0.20	0.01	35.39	0.05	0.41	0.58	0.00	0.44	3.86	0.82	0.23	nd	nd	nd	nd	78	13	2
DP-3	13.8	nd	0.00	0.00	2.06	0.01	0.00	0.02	0.03	0.01	0.03	0.22	0.01	0.73	1.93	1.94	20.29	0.14	0.01	28.46	0.03	0.34	0.37	0.00	0.37	1.46	1.03	0.16	nd	nd	nd	nd	60	9	2
DP-4	13.1	0.00	0.00	0.00	1.16	0.01	0.00	0.01	0.02	0.01	0.04	0.47	0.01	0.99	nd	2.16	20.90	0.06	0.01	24.22	0.07	0.31	0.45	0.00	0.31	1.35	0.77	0.18	nd	1.23	nd	0.25	55	9	1
LA-0	19.5	nd	nd	nd	0.86	0.01	0.00	0.02	0.01	0.00	0.02	0.26	0.01	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1	1	1
LA-1FW	18.4	nd	nd	0.00	0.87	0.01	0.00	0.01	0.01	0.00	0.02	0.31	0.01	0.37	nd	1.54	14.89	0.01	0.00	18.61	0.05	0.22	0.34	0.00	0.37	0.48	0.49	0.12	nd	nd	nd	nd	39	5	1
LA-1W+	17.5	nd	nd	0.00	16.90	0.02	0.00	0.01	0.01	0.00	0.01	0.08	0.00	0.35	nd	1.75	22.08	0.01	0.01	23.54	0.05	0.30	0.39	0.00	0.34	0.46	0.48	0.15	nd	nd	nd	nd	67	21	17
LA-1W	17.2	nd	nd	0.00	17.36	0.01	0.00	0.01	0.01	0.00	0.00	0.06	0.00	4.96	nd	1.75	26.63	0.28	0.01	32.14	0.05	0.35	0.49	0.00	0.33	8.12	0.40	0.19	nd	nd	nd	nd	93	34	17
LA-1C	15.7	nd	0.00	0.00	9.25	0.07	0.00	0.06	0.09	0.00	0.02	0.13	0.00	4.02	3.18	2.44	18.80	0.16	0.01	21.09	0.04	0.17	0.39	0.00	0.33	10.30	0.27	0.26	nd	nd	0.04	nd	71	28	9
LA-1E	14.8	nd	nd	0.00	1.78	0.04	0.00	0.01	0.02	0.00	0.01	0.09	0.00	3.80	nd	1.69	35.33	0.22	0.01	30.77	0.08	0.20	0.47	0.00	0.39	6.58	0.42	0.16	nd	nd	nd	nd	82	15	2
LA-2W	13.0	0.00	0.00	0.00	1.34	0.06	0.01	0.04	0.19	0.00	0.01	0.06	0.00	3.98	nd	2.57	25.09	0.14	0.01	24.62	0.05	0.27	0.51	0.00	0.41	37.68	0.81	0.24	nd	2.51	nd	0.18	101	51	2
LA-2E	12.6	0.00	0.00	0.00	0.78	0.02	0.00	0.00	0.01	0.00	0.01	0.10	0.00	5.63	nd	1.95	21.96	0.27	0.01	20.88	0.03	0.30	0.53	0.00	0.33	2.93	0.51	0.26	nd	2.84	nd	0.19	60	16	1
LA-2FE	11.2	nd	0.00	0.00	0.32	0.05	0.00	0.03	0.02	0.00	0.01	0.08	0.00	0.85	0.85	2.51	26.39	0.18	0.01	27.66	0.04	0.27	0.53	0.00	0.48	0.75	0.33	0.17	nd	nd	nd	nd	62	6	0
LA-3W	10.5	nd	0.00	0.00	0.96	0.03	0.00	0.02	0.03	0.00	0.01	0.09	0.00	0.61	0.79	2.13	22.29	0.10	0.01	24.36	0.04	0.25	0.46	0.00	0.24	0.41	0.37	0.18	nd	nd	nd	nd	53	5	1
LA-3	9.3	0.00	0.00	0.00	0.83	0.02	0.00	0.01	0.01	0.00	0.01	0.18	0.00	5.18	nd	1.39	21.95	0.28	0.01	28.30	0.05	0.26	0.48	0.00	0.15	9.55	0.26	0.18	nd	nd	nd	0.16	69	19	1
LA-3E	8.8	0.01	0.00	0.00	nd	nd	nd	nd	nd	0.00	0.01	0.12	0.00	0.66	1.12	3.80	115.21	0.54	0.01	71.98	0.11	0.40	2.86	0.00	1.34	0.91	1.40	0.48	nd	nd	nd	nd	201	10	0
LA-4W	6.0	nd	0.00	0.00	0.92	0.00	0.00	0.00	0.01	nd	nd	nd	nd	3.64	nd	1.26	21.88	0.24	0.01	24.40	0.05	0.22	0.39	0.00	0.18	3.59	0.51	0.11	nd	nd	nd	nd	57	11	1
LA-4E	5.0	nd	0.00	0.00	0.92	0.00	0.00	0.00	0.01	nd	nd	nd	nd	2.16	nd	1.58	21.94	0.13	0.00	24.87	0.03	0.08	0.42	0.00	0.25	1.63	0.80	0.09	nd	nd	nd	nd	55	8	1
LA-4FE	4.3	nd	0.00	0.00	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.67	0.90	2.64	53.02	0.03	0.01	51.24	0.07	0.18	1.03	0.00	0.26	1.78	0.62	0.23	nd	nd	nd	nd	113	6	0
LA-5	0.9	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	4.32	0.78	0.73	27.74	0.20	0.01	23.96	0.02	0.09	0.35	0.00	0.25	1.63	0.47	0.09	nd	2.91	nd	0.13	64	11	0
LA-5E	0.1	0.00	0.00	0.00	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.70	nd	2.82	61.74	0.24	0.01	42.95	0.05	0.18	1.21	0.00	0.65	0.44	0.80	0.15	nd	nd	nd	nd	112	6	0
Baseline	20.0	nd	0.00	0.00	nd	nd	nd	nd	nd	0.00	0.01	0.13	0.01	0.86	1.00	5.83	270.24	0.79	0.01	68.92	0.15	0.54	6.92	0.00	1.90	2.48	3.24	0.51	nd	nd	nd	nd	364	16	0
AC-1	19.1	nd	0.00	0.00	2.32	0.01	0.00	0.05	0.04	0.00	0.02	0.78	0.01	0.85	1.14	4.20	35.59	0.06	0.02	50.73	0.06	0.87	0.78	0.00	0.70	0.15	0.76	0.46	nd	nd	nd	nd	100	11	2
AC-2	18.8	nd	0.00	0.00	1.48	0.01	0.00	0.03	0.03	0.00	0.02	0.66	0.00	0.90	1.17	4.35	32.73	0.05	0.01	55.26	0.06	0.95	0.81	0.00	0.61	0.15	0.75	0.49	nd	nd	nd	nd	101	11	2
ACS	18.6	nd	0.00	0.00	1.54	0.00	0.00	0.04	0.02	0.00	0.01	0.17	0.00	0.44	0.74	2.05	10.67	0.29	0.01	17.98	0.05	0.56	0.31	0.00	0.27	2.86	0.35	0.16	0.32	nd	nd	nd	39	9	2
AC-3	18.3	0.00	0.00	0.00	44.89	0.03	0.00	0.03	0.04	0.00	0.01	0.20	0.00	0.75	0.34	1.85	18.03	0.48	0.01	25.74	0.04	0.36	0.47	0.00	0.43	3.41	0.66	0.18	nd	2.42	nd	0.10	100	56	45
P-1FW	18.5	nd	nd	nd	1.15	0.01	0.00	0.01	0.01	0.00	0.01	0.08	0.00	0.40	0.74	3.17	28.33	0.01	0.01	44.32	0.04	0.28	0.79	0.00	0.42	0.16	1.23	0.20	nd	nd	nd	nd	81	7	1
P-1W	18.3	0.00	0.00	0.00	0.81	0.02	0.00	0.01	0.01	0.00	0.01	0.10	0.00	0.89	0.94	2.96	41.01	0.24	0.01	34.07	0.07	0.39	0.99	0.00	0.51	4.29	0.66	0.28	0.05	2.46	nd	0.15	91	14	1
P-1E	17.8	0.00	0.00	0.00	2.41	0.01	0.00	0.00	0.00	0.00	0.01	0.22	0.00	1.73	1.25	2.18	28.09	0.32	0.01	30.23	0.04	0.29	0.74	0.00	0.43	3.02	0.55	0.21	0.05	2.67	nd	0.29	75	14	2
WC	17.8	nd	nd	nd	0.78	0.00	0.00	0.00	0.01	0.00	0.01	0.07	0.00	0.33	0.63	2.11	15.69	0.01	0.00	28.94	0.03	0.18	0.62	0.00	0.23	0.14	1.80	0.18	nd	nd	nd	nd	52	6	1
P-2W	14.6	nd	0.00	0.00	0.85	0.01	0.00	0.00	0.01	nd	nd	nd	nd	0.70	nd	1.40	36.86	0.28	0.01	35.30	0.05	0.18	0.83	0.00	0.55	5.98	1.06	0.17	nd	nd	nd	nd	84	11	1
P-2E	13.3	nd	0.00	0.00	0.98	0.00	0.00	0.00	0.01	nd	nd	nd	nd	0.56	nd	2.05	21.29	0.37	0.00	27.47	0.06	0.10	0.46	0.00	0.35	7.14	2.03	0.13	nd	nd	nd	nd	63	14	1
P-3W	11.4	nd	0.00	0.00	0.88	0.00	0.00	0.00	0.01	nd	nd	nd	nd	0.55	0.96	1.40	25.35	0.26	0.00	26.40	0.05	0.12	0.62	0.00	0.48	4.70	1.38	0.13	nd	nd	nd	nd	63	10	1
P-3E	10.4	nd	0.00	0.00	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.46	0.88	4.16	67.08	0.16	0.01	53.30	0.06	0.22	1.49	0.00	0.88	0.31	0.48	0.18	nd	nd	nd	nd	130	7	0
P-4W	9.5	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.01	0.00	0.01	0.12	0.00	2.15	nd	2.24	29.66	0.28	0.01	32.53	0.04	0.15	0.63	0.00	0.14	4.18	1.52	0.20	nd	3.24	nd	0.16	78	15	1
P-4E	8.6	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.01	0.00	0.01	0.06	0.00	0.91	1.13	2.74	46.83	0.15	0.01	39.03	0.04	0.17	1.21	0.00	0.57	0.98	2.44	0.24	nd	7.88	nd	0.12	105	17	1
?		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.14	nd	1.33	58.75	0.29	0.01	63.74	0.06	0.25	1.27	0.00	0.37	nd	4.06	0.19	nd	nd	nd	nd	131	8	0

n/a = ESL not available
nd = no data for subreach

SubReach	Distance from Rio Grande	Cyanide__Total HQ	Americium_241_GS HQ	Plutonium_239 HQ	Aroclor_1254 HQ	Aroclor_1260 HQ	DDE_4_4__HQ	DDT_4_4__HQ	Endrin_Aldehyde HQ	Acenaphthene HQ	Bis_2_ethylhexyl_phthalate HQ	Chrysene HQ	Naphthalene HQ	Antimony HQ	Antimony - detects HQ	Arsenic HQ	Barium HQ	Cadmium HQ	Chromium_Total HQ	Cobalt HQ	Copper HQ	Lead HQ	Manganese HQ	Mercury HQ	Selenium HQ	Silver HQ	Thallium HQ	Zinc HQ	Methylmercury_1_Ion HQ	Titanium HQ	Total_Uranium_by_CPMS HQ	Uranium HQ	HI -all	HI - w/o Ba,Co,Mn	HI - PCB/pest
ESL		0.1	4000	2100	0.041	0.44	0.0026	0.0026	0.011	n/a	1	n/a	0.2	n/a	n/a	19	230	0.71	460	0.051	390	55	3800	3.7	1.1	14	n/a	97	4E-04	n/a	20	20			
DP-1W	16.4	nd	0.00	0.00	**6.27**	0.58	**12.95**	**23.08**	**3.06**	n/a	1.13	n/a	8.51	n/a	n/a	0.09	0.29	0.27	0.02	53.78	0.03	1.34	0.05	0.02	0.41	0.01	n/a	0.88	nd	n/a	nd	nd	113	59	46
DP-1C	16.3	nd	0.00	0.00	0.92	0.29	nd	nd	nd	n/a	0.74	n/a	4.37	n/a	n/a	0.10	0.24	0.16	0.02	52.77	0.02	1.00	0.07	0.01	0.21	0.03	n/a	0.60	nd	n/a	nd	nd	62	8	1
DP-1E	15.5	nd	0.00	0.00	1.28	0.17	**7.50**	**7.73**	**1.77**	n/a	0.78	n/a	6.31	n/a	n/a	0.11	0.24	0.30	0.02	49.08	0.02	1.75	0.06	0.01	0.31	0.01	n/a	0.72	nd	n/a	nd	nd	78	29	18
DP-2	14.7	nd	0.00	0.00	0.90	0.18	**2.18**	**15.35**	0.52	n/a	0.49	n/a	2.06	n/a	n/a	0.10	0.28	0.24	0.01	63.15	0.02	0.74	0.08	0.01	0.37	0.03	n/a	0.54	nd	n/a	nd	nd	87	24	19
DP-3	13.8	nd	0.00	0.00	1.11	0.12	**1.98**	**5.77**	0.47	n/a	0.92	n/a	4.08	n/a	n/a	0.08	0.21	0.18	0.01	50.78	0.01	0.62	0.05	0.01	0.31	0.01	n/a	0.37	nd	n/a	nd	nd	67	16	9
DP-4	13.1	1.50	0.00	0.00	0.62	0.06	**1.39**	**3.94**	0.29	n/a	1.11	n/a	5.70	n/a	n/a	0.09	0.22	0.07	0.01	43.21	0.03	0.56	0.06	0.01	0.26	0.01	n/a	0.43	nd	n/a	nd	0.34	60	16	6
LA-0	19.5	nd	nd	nd	0.46	0.10	**3.76**	**8.84**	0.17	n/a	0.62	n/a	3.18	n/a	n/a	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	n/a	nd	nd	n/a	nd	nd	17	17	13
LA-1FW	18.4	nd	nd	0.00	0.46	0.07	**1.06**	**4.50**	0.17	n/a	0.61	n/a	3.12	n/a	n/a	0.07	0.16	0.02	0.01	33.20	0.02	0.40	0.05	0.00	0.30	0.00	n/a	0.27	nd	n/a	nd	nd	44	11	6
LA-1W+	17.5	nd	nd	0.00	**9.07**	0.22	**1.04**	**4.29**	0.18	n/a	0.45	n/a	0.99	n/a	n/a	0.08	0.23	0.02	0.01	42.00	0.02	0.54	0.05	0.01	0.28	0.00	n/a	0.35	nd	n/a	nd	nd	60	18	15
LA-1W	17.2	nd	nd	0.00	**9.31**	0.12	0.79	**2.67**	0.19	n/a	0.12	n/a	0.83	n/a	n/a	0.08	0.28	0.34	0.01	57.35	0.02	0.64	0.07	0.01	0.27	0.05	n/a	0.44	nd	n/a	nd	nd	74	16	13
LA-1C	15.7	nd	0.00	0.00	**4.96**	0.80	**1.98**	**23.59**	**1.50**	n/a	0.46	n/a	2.00	n/a	n/a	0.11	0.20	0.20	0.02	37.63	0.02	0.31	0.05	0.06	0.27	0.07	n/a	0.61	nd	n/a	0.06	nd	75	37	33
LA-1E	14.8	nd	nd	0.00	0.96	0.49	**1.60**	**3.91**	0.28	n/a	0.30	n/a	1.03	n/a	n/a	0.07	0.37	0.27	0.01	54.90	0.03	0.36	0.06	0.02	0.32	0.04	n/a	0.37	nd	n/a	nd	nd	65	10	7
LA-2W	13.0	1.13	0.00	0.00	0.72	0.64	**14.02**	**16.83**	**3.31**	n/a	0.23	n/a	0.97	n/a	n/a	0.11	0.26	0.17	0.02	43.92	0.02	0.49	0.07	0.03	0.34	0.24	n/a	0.56	nd	n/a	nd	0.24	84	40	36
LA-2E	12.6	1.35	0.00	0.00	0.42	0.18	0.61	0.61	0.14	n/a	0.18	n/a	0.79	n/a	n/a	0.09	0.23	0.33	0.02	37.25	0.02	0.54	0.07	0.01	0.27	0.02	n/a	0.61	nd	n/a	nd	0.26	44	6	2
LA-2FE	11.2	nd	0.00	0.00	0.17	0.60	**3.17**	**11.18**	0.39	n/a	0.18	n/a	0.96	n/a	n/a	0.11	0.28	0.22	0.02	49.35	0.02	0.48	0.07	0.02	0.40	0.00	n/a	0.41	nd	n/a	nd	nd	68	18	16
LA-3W	10.5	nd	0.00	0.00	0.51	0.33	**2.09**	**8.63**	0.49	n/a	0.22	n/a	1.05	n/a	n/a	0.09	0.23	0.13	0.01	43.46	0.02	0.45	0.06	0.01	0.20	0.00	n/a	0.43	nd	n/a	nd	nd	58	15	12
LA-3	9.3	1.31	0.00	0.00	0.44	0.18	**1.20**	**2.45**	0.09	n/a	0.41	n/a	2.07	n/a	n/a	0.06	0.23	0.34	0.01	50.49	0.02	0.47	0.07	0.01	0.12	0.06	n/a	0.43	nd	n/a	nd	0.21	61	10	4
LA-3E	8.8	**23.50**	0.00	0.00	nd	nd	nd	nd	nd	n/a	0.26	n/a	1.38	n/a	n/a	0.17	1.20	0.66	0.02	128.43	0.05	0.72	0.39	0.02	1.11	0.01	n/a	1.14	nd	n/a	nd	nd	159	29	0
LA-4W	6.0	nd	0.00	0.00	0.49	0.05	0.78	1.37	0.18	n/a	nd	n/a	nd	n/a	n/a	0.06	0.23	0.30	0.01	43.53	0.02	0.40	0.05	0.01	0.15	0.02	n/a	0.27	nd	n/a	nd	nd	48	4	3
LA-4E	5.0	nd	0.00	0.00	0.49	0.05	0.78	0.78	0.18	n/a	nd	n/a	nd	n/a	n/a	0.07	0.23	0.16	0.01	44.37	0.01	0.14	0.06	0.00	0.21	0.01	n/a	0.22	nd	n/a	nd	nd	48	3	2
LA-4FE	4.3	nd	0.00	0.00	nd	nd	nd	nd	nd	n/a	nd	n/a	nd	n/a	n/a	0.12	0.55	0.03	0.01	91.42	0.03	0.32	0.14	0.01	0.21	0.01	n/a	0.55	nd	n/a	nd	nd	93	1	0
LA-5	0.9	3.09	0.00	0.00	0.16	0.02	0.13	0.13	0.03	n/a	0.06	n/a	0.95	n/a	n/a	0.03	0.29	0.24	0.01	42.76	0.01	0.16	0.05	0.01	0.21	0.01	n/a	0.22	nd	n/a	nd	0.18	49	6	0
LA-5E	0.1	**13.82**	0.00	0.00	nd	nd	nd	nd	nd	n/a	nd	n/a	nd	n/a	n/a	0.12	0.64	0.29	0.01	76.63	0.02	0.32	0.17	0.00	0.54	0.00	n/a	0.35	nd	n/a	nd	nd	93	15	0
Baseline	20.0	nd	0.00	0.00	nd	nd	nd	nd	nd	n/a	0.31	n/a	5.09	n/a	n/a	0.25	2.82	0.97	0.02	122.97	0.07	0.98	0.95	0.00	1.57	0.02	n/a	1.22	nd	n/a	nd	nd	137	11	0
AC-1	19.1	nd	0.00	0.00	**1.25**	0.16	**5.76**	**20.38**	0.74	n/a	0.51	n/a	3.71	n/a	n/a	0.18	0.37	0.08	0.02	90.52	0.03	1.58	0.11	0.01	0.58	0.00	n/a	1.10	nd	n/a	nd	nd	127	36	28
AC-2	18.8	nd	0.00	0.00	0.80	0.11	**2.61**	**11.54**	0.45	n/a	0.63	n/a	2.43	n/a	n/a	0.19	0.34	0.06	0.02	98.60	0.02	1.72	0.11	0.01	0.51	0.00	n/a	1.16	nd	n/a	nd	nd	121	22	16
ACS	18.6	nd	0.00	0.02	0.83	0.04	**2.66**	**14.94**	0.33	n/a	0.43	n/a	2.12	n/a	n/a	0.09	0.11	0.35	0.01	32.08	0.02	1.03	0.04	0.03	0.22	0.02	n/a	0.38	2.87	n/a	nd	nd	59	26	19
AC-3	18.3	2.88	0.00	0.03	**24.09**	0.34	**3.89**	**11.56**	0.73	n/a	0.21	n/a	1.43	n/a	n/a	0.08	0.19	0.59	0.01	45.94	0.02	0.66	0.06	0.03	0.35	0.02	n/a	0.43	nd	n/a	nd	0.13	94	47	41
P-1FW	18.5	nd	nd	nd	0.62	0.07	0.86	3.21	0.18	n/a	0.22	n/a	1.01	n/a	n/a	0.14	0.30	0.02	0.01	79.08	0.02	0.51	0.11	0.00	0.35	0.00	n/a	0.48	nd	n/a	nd	nd	87	8	5
P-1W	18.3	3.13	0.00	0.00	0.43	0.18	0.93	4.02	0.16	n/a	0.45	n/a	0.82	n/a	n/a	0.13	0.43	0.30	0.01	60.78	0.03	0.71	0.14	0.04	0.42	0.03	n/a	0.67	0.48	n/a	nd	0.20	74	13	6
P-1E	17.8	3.51	0.00	0.02	**1.29**	0.11	0.13	0.76	0.03	n/a	0.16	n/a	0.81	n/a	n/a	0.10	0.29	0.39	0.01	53.94	0.02	0.53	0.10	0.04	0.36	0.02	n/a	0.50	0.43	n/a	nd	0.39	64	10	2
WC	17.8	nd	nd	nd	0.42	0.04	0.71	0.70	0.16	n/a	0.17	n/a	0.85	n/a	n/a	0.09	0.16	0.01	0.01	51.63	0.01	0.33	0.08	0.00	0.19	0.00	n/a	0.43	nd	n/a	nd	nd	56	4	2
P-2W	14.6	nd	0.00	0.00	0.46	0.07	0.72	0.72	0.17	n/a	nd	n/a	nd	n/a	n/a	0.06	0.38	0.35	0.01	62.99	0.02	0.33	0.11	0.02	0.46	0.04	n/a	0.39	nd	n/a	nd	nd	67	4	2
P-2E	13.3	nd	0.00	0.00	0.52	0.05	0.83	0.83	0.20	n/a	nd	n/a	nd	n/a	n/a	0.09	0.22	0.45	0.01	49.02	0.03	0.18	0.06	0.02	0.29	0.05	n/a	0.32	nd	n/a	nd	nd	53	4	2
P-3W	11.4	nd	0.00	0.00	0.47	0.05	0.74	0.74	0.18	n/a	nd	n/a	nd	n/a	n/a	0.06	0.26	0.31	0.01	47.10	0.02	0.22	0.09	0.01	0.39	0.03	n/a	0.31	nd	n/a	nd	nd	51	4	2
P-3E	10.4	nd	0.00	0.00	nd	nd	nd	nd	nd	n/a	nd	n/a	nd	n/a	n/a	0.18	0.70	0.19	0.01	95.10	0.03	0.39	0.20	0.01	0.73	0.00	n/a	0.44	nd	n/a	nd	nd	98	2	0
P-4W	9.5	**5.60**	0.00	0.00	0.37	0.03	0.58	0.58	0.14	n/a	0.17	n/a	1.10	n/a	n/a	0.10	0.31	0.34	0.01	58.04	0.02	0.27	0.09	0.01	0.12	0.03	n/a	0.47	nd	n/a	nd	0.22	69	10	2
P-4E	8.6	2.25	0.00	0.00	0.37	0.03	0.58	0.58	0.14	n/a	0.17	n/a	0.83	n/a	n/a	0.12	0.49	0.18	0.01	69.64	0.02	0.31	0.17	0.01	0.47	0.01	n/a	0.56	nd	n/a	nd	0.17	77	7	2
?		nd	nd	nd	nd	nd	nd	nd	nd	n/a	nd	n/a	nd	n/a	n/a	0.06	0.61	0.35	0.02	113.73	0.03	0.45	0.17	0.02	0.31	nd	n/a	0.46	nd	n/a	nd	nd	116	2	0

n/a = ESL not available
nd = no data for subreach

4/19/02

LAPSAR Meeting Notes – Discussion of Assessment Endpoints and Associated Measures

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1) Entity = Plants [primary producers]
Attributes: native plant species [presence/absence, density, diversity], biomass, succession or recruitment
Measures: germination test [% germination, biomass {height} – is OM a confounding factor?], root elongation, field measures of abundance/diversity, may be interesting to evaluate succession in relation to geomorphic units [geomorphic units sometimes based on plant cover – e.g., reach P-4, can we compare plant communities with different levels of COPECs but same point in successional sequence]
Considerations: toxicity tests require extrapolation to relate to an attribute like biomass

2) Entity = Invertebrates [detritivores]
Need to consider if invertebrates should be an AE for the terrestrial ecosystem. One point in favor is that we are missing many invert ESLs making screening incomplete for this part of the food web. As we are likely considering aquatic inverts in the aquatic assessment, we may be able to argue that aquatic inverts are more sensitive and could use them as a protective surrogate for terrestrial inverts [detritivores]. Another point of consideration is whether we value invertebrates or the role they play [along with other taxa] in nutrient cycling. For example, measures related to nutrient cycling like litterbags may be more relevant. Consensus seemed to be that we should argue against seeing adverse effects on invertebrates and drop them as AEs.

3) Entity = Robin-invertevore [avian ground invertevore]
Attributes: population abundance and persistence of blue birds [or other species – need to talk to the Dave Keller about birds in this feeding guild on the Pajarito Plateau]
Measures: nest box study [nest occupancy, nest success, egg concentrations, eggshell thickness?], concentration of COPECs in food [use in revised wildlife exposure model], habitat preferences [blue birds do not nest in AC or DP-1 where we have some of the highest concentrations of DDT/PCBs]

4) Entity = T&E raptors – avian carnivore [spotted owl]
Attributes: decreased survival or reproduction
Measures: nesting preferences, concentration of COPECs in food [small mammals], look at great horned owls as surrogate

5) Entity = Shrew [mammalian ground invertevore]
Attributes: population abundance and persistence of deer mice [or other species – need to talk to the Dave Keller about small mammals in this feeding guild on the Pajarito Plateau]
Measures: field measures of abundance/reproduction, concentration of COPECs in food [inverts]

Potential confounding factors for assessment

a) Cerro Grande effects in upper watershed [metapopulation connections]
b) Residence time of species
c) Drought in 2002
d) Elevated ash/muck concentrations

What are the valued entities for LA and Pueblo Canyons?

Threatened and endangered (T&E) raptor species (primarily spotted owl)
Species as representatives of the terrestrial food web in Los Alamos and Pueblo Canyons

1. Avian ground invertevores
2. Mammalian invertevores
3. Detritivores (earthworms)
4. Primary producers (plants)

What are the attributes of these entities at risk?

Information on the contaminants of potential ecological concern (COPECs) is derived from the ECORISK Database (March 2002 version). Screening levels are based on existing toxicity information for terrestrial plants and animals. Toxicity information is primarily based on adverse effects on reproduction or survival for individual organisms measured in laboratory toxicity studies. Some toxicity values are also based on other ecologically relevant effects (e.g., reduced body weight). Screening of maximum concentrations against screening levels for terrestrial receptors yielded a list of 29 COPECs. These COPECs were categorized into groups that included analytes with ubiquitous HQ (hazard quotient or ratio of sediment concentration to ESL) values >> one, analytes within localized areas that have HQ values >> 1, and analytes with most HQ values < one (Table 1). Analytes in the first group primarily include metals that are elevated in concentration in post-Cerro Grande fire deposits. Analytes in the second group include DDT (plus metabolites) and PCBs (Aroclor-1254). Potential adverse effects of these COPECs on plants and animals include decreased reproduction or increased mortality. Analytes in the third group also have elevated HQ values across the canyons, but at lower levels than the first group. Analytes in the last group have HQ values close to or less than one for the subreach average data suggesting that they are unlikely to be risk drivers.

For T&E species, we are concerned about adverse impacts on individual Mexican Spotted Owls. Because the owl does not currently nest in Los Alamos and Pueblo Canyons, we will look at the potential for adverse effects through a combination of model and empirical studies.

For species more broadly representative of the food web in Los Alamos and Pueblo Canyon, we are concerned with potential for adverse effects on animal populations. For detritivores we are concerned about potential decreases in nutrient cycling rates. For plants, we are concerned about maintaining the diversity of native plant species.

How will the attributes be measured and what are the potential uncertainties associated with these measures?

For each assessment endpoint, measures of exposure (e.g., sediment concentrations, concentrations in food), measures of effects (e.g., results of toxicity bioassays, literature toxicity information), and measures of ecosystem/receptor characteristics (e.g., nesting habitat, foraging habitat). Potential confounding factors affecting the assessment include: Cerro Grande effects in upper watershed (metapopulation connections between lower parts of canyons and burned part of watershed), residence time of species, and drought conditions in 2001-2002.

Table 1. Synopsis of HQ Analysis of LAPSAR Potential Contaminants

Constituent	LA & DP Group	Acid & Pueblo Group	Receptor Used as Basis of Grouping
Antimony	1	3	Plant
Antimony (detects)	2	2	Plant
Aroclor-1254	2	2	Shrew, robin
Arsenic	3	2	Shrew
Barium	1	1	Shrew
Cadmium	4	4	N/A
Chromium VI/III=1/6	1	2	Plant, invert
Cobalt	1	1	Robin, shrew
Cyanide	*	*	N/A
DDE	2	2	Robin
DDT	2	2	Robin
Endrin aldehyde	2	2	Plant, robin
Manganese	3	3	Plant
Mercury	2	2	Invert
Naphthalene	3	3	Robin
Naphthalene detects	3	3	Robin
Plutonium-239,240	4	2	Invert
Selenium	3	3	Plant
Silver	2	2	Shrew, plant
Thallium	4	3	Plant, shrew
Titanium	4	2	Shrew
Zinc	3	2	Plant

* Too few samples
Group 1: high HQs occur over most of the canyon
Group 2: high HQs occur at particular spots within canyon
Group 3: lower but still elevated HQs occur over most of the canyon
Group 4: HQs are close to target hazard goal or background HQ throughout canyon; therefore this constituent is unlikely to be a risk driver

Assessment endpoint description
Threatened and Endangered (T&E) Raptors (Mexican Spotted Owl) – also represent the avian carnivore feeding guild. Note that the Bald Eagle also potentially forages in lower Los Alamos Canyon (near the Rio Grande), but the lower intensity of foraging and the lower concentrations of COPECs in lower Los Alamos Canyon lead to eliminating the Bald Eagle as an endpoint for this assessment.

Assessment endpoint attributes
Decreased individual survival or reproduction.
Effects Question Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased survival and/or reproduction of Mexican Spotted Owls?
Societal relevance High due the special status as a T&E species. Raptors also have great cultural significance for some populations, and birds in general hold special interest for many others.
Ecological relevance T&E species inherently play a lesser role ecologically due to their reduced abundance. However, the spotted owl is an indicator for a broader ecological community. Thus, measures taken to increase the abundance of the spotted owl should also protect other species more broadly representative of older growth forests.
Susceptibility to hazardous agent Some of the COPECs in Los Alamos and Pueblo Canyons are bioaccumulative, persistent, and toxic chemicals (e.g., DDT and metabolites). DDT is especially known for its impacts on bird populations, and higher trophic level birds in particular. Birds are also potentially susceptible to several metals, but this is dependent on the metals being present in a bioavailable form.
Accessibility to prediction and measurement The spotted owl does not currently nest in Los Alamos and Pueblo Canyons. Thus, direct measures of adverse effects are not possible for this endpoint. An indirect measure of effect is the calculated hazard quotient using literature toxicity information and modeled foraging preferences within the potential nesting habitat in upper Los Alamos Canyon (using ECORSK.6). The measure of receptor characteristics is the inferred nesting habitat based on vegetation type (mixed conifer forest). Measures of exposure will include empirical and modeled concentrations in representative prey species (deer mouse, etc.). An alternative is to look at great horned owls as surrogate for the spotted owl, and other more direct measures are possible (collect tissue or whole owl samples for chemical analysis of contaminant uptake). Information on the residence time and foraging patterns of great horned owls are needed to interpret these data.

Summary Table for Measures Related to Mexican Spotted Owl Assessment Endpoint

Line of Evidence	Cost (Low, Med, High)	Difficulty of Data Collection (Easy, Hard)	Weight of Evidence Criteria (low, med, high)
Modeled exposure and literature toxicity information to calculate spatially weighted HQ values using ECORSK.6 [includes consideration of nesting and foraging habitat based on vegetation class coverage]	Low	Easy	
Modeled and measured concentrations in prey species – could determine if exposure concentrations differ within the watershed in relation to sediment concentrations - design could use a gradient in COPEC concentrations with the LA/Pueblo watershed and also compare concentrations to "reference" locations [can also evaluate food limitation effect]	Med	Hard	
Measured concentrations [whole body or non-destructive – blood, feathers, scat] in great horned owls [combined with information on foraging area and residence time for sampled owls] – design could use a gradient in COPEC concentrations with the LA/Pueblo watershed and also compare concentrations to "reference" locations [use existing great horned owl data in a qualitative manner]	High	Hard	
The concentration of COPECs in sediment	N/A	N/A	Low

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased survival and/or reproduction of Mexican Spotted Owls?
Line of Evidence (measure)	Modeled exposure and literature toxicity information to calculate spatially weighted HQ values using ECORSK.6
1) Biological linkage between assessment endpoint and measure Low. The model is based on foraging characteristics of spotted owls and literature information on toxicity. The toxicity information is from avian studies, and is relevant to the evaluation of adverse effects on spotted owls. This ranks low because empirical data cannot be collected to evaluate the effects question.	
2) Correlation of stressor to response The linkage between the assessment endpoint and measure is low.	
3) Utility of measure for judging environmental harm Medium. HQs are well-accepted methodology, but they only represent an indicator of adverse effects and not a direct of measure of harm.	
4) Extent to which Data Quality Objectives are met N/A	
5) Site-specificity Medium. Foraging information is site-specific but toxicity information is not.	
6) Sensitivity of the measure for detecting changes N/A	
7) Spatial representativeness High. Model area will include most likely location of potential spotted owl nesting/foraging habitat.	
8) Temporal representativeness N/A.	
9) Quantitativeness Medium. Quantitative, but not a statistical relationship [unless dose-response relationships can be used in place of TRVs].	
10) Use of a standard method Medium. HQs are standard but the model itself [ECORSK.6] has been used only at LANL.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased survival and/or reproduction of Mexican Spotted Owls?
Line of Evidence (measure)	Modeled and measured concentrations in prey species
1) Biological linkage between assessment endpoint and measure Medium. Requires literature toxicity information to make inferences on potential for adverse effects. Also requires information on potential foraging habitat, as spotted owls do not currently next in LA/Pueblo Canyons.	
2) Correlation of stressor to response Medium. See answer to item 1.	
3) Utility of measure for judging environmental harm Medium. The measured concentrations in food can be divided by literature toxicity values to derive the HQ, but they only represent an indicator of adverse effects and not a direct of measure of harm.	
4) Extent to which Data Quality Objectives are met Medium. Field studies with small mammals are prone to logistical problems that may preclude meeting all DQOs.	
5) Site-specificity Medium. Prey information is site-specific but toxicity information is not.	
6) Sensitivity of the measure for detecting changes N/A	
7) Spatial representativeness High. Study area will include most likely location of potential spotted owl nesting/foraging habitat.	
8) Temporal representativeness Low. Small mammal study will necessarily represent a snapshot in time. Seasonal changes in body burdens are expected to be large as diets shift through the year. Effects of the drought may also be manifested in data collected.	
9) Quantitativeness High. Develop statistical relationship between small mammal concentrations and sediment concentrations.	
10) Use of a standard method Low. Small mammal body burden studies are not standardized.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased survival and/or reproduction of Mexican Spotted Owls?
Line of Evidence (measure)	Measured concentrations in great horned owls
1) Biological linkage between assessment endpoint and measure High. Species are similar in diet and foraging area.	
2) Correlation of stressor to response Medium. Depends on the number of great horned being sampled and the knowledge of their foraging range relative to COPEC concentrations.	
3) Utility of measure for judging environmental harm Medium. Body burdens in great horned owls are useful as a measure of exposure for spotted owls. Uncertainties relate to interspecies extrapolations and to understanding the foraging range of the owls being sampled. There is also uncertainty in correlating a body burden to an intake rate for comparison to TRVs.	
4) Extent to which Data Quality Objectives are met Low. Likely to have difficulty in getting information on foraging range of great horned owls being sampled.	
5) Site-specificity Medium. Owl information is site-specific but need toxicity information that is not site-specific to interpret owl body burden data.	
6) Sensitivity of the measure for detecting changes Low. Uncertainties in foraging range of sampled owls is the main issue.	
7) Spatial representativeness Medium. Assuming that owls can be sampled from LA/Pueblo Canyons. Does not rank higher due to uncertainty in foraging range of sampled owls.	
8) Temporal representativeness Medium. Sampled owls will have integrated lifetime exposure, but there may be some uncertainty of foraging range of sampled owls.	
9) Quantitativeness Medium. Can develop statistical relationship between owls and general foraging area, but this assumes that this information is readily available.	
10) Use of a standard method Low. Owl body burden analysis is not a standard method.	
Overall weight (low, medium, high)	

Assessment endpoint description
Avian ground invertevore feeding guild.

Assessment endpoint attributes Decreased population abundance or persistence and species diversity.
Effects Question Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of avian ground invertevore feeding guild species (e.g., robin, blue bird, ash throated flycatcher, etc.)?
Societal relevance Birds in general hold special interest for many people.
Ecological relevance Ecological relevance is implied by selecting a speciose and abundant feeding guild (avian ground invertevore). Due to the greater exposure potential for ground foraging birds compared to aerial insectivores, this AE may also be considered as representatives of that feeding guild as well.
Susceptibility to hazardous agent Some of the COPECs in Los Alamos and Pueblo Canyons are bioaccumulative, persistent, and toxic chemicals (e.g., DDT and metabolites). DDT is especially known for its impacts on bird populations. Birds are also potentially susceptible to several metals, but this is dependent on the metals being present in a bioavailable form.
Accessibility to prediction and measurement For this assessment, we will use the blue bird as a representative species for the avian ground invertevore feeding guild. The blue bird has a greater residence time in the canyon and also has a small home range and high rate of food intake – factors that tend to maximize the impact of possible adverse effects of COPECs. Blue bird nesting habitat overlaps with most of areas in Los Alamos and Pueblo Canyons with elevated concentrations of COPECs. Two areas that have elevated concentrations of COPECs (Reaches AC-1, AC-2, ACS, AC-3, DP-1) are not in preferred blue bird nesting habitat. The main advantage of selecting the blue bird as a representative species for this feeding guild is the existing network of nest boxes in Los Alamos and Pueblo Canyons. The existing network of nest boxes would have to be augmented to cover upper Los Alamos Canyon and possibly Acid Canyon or upper DP Canyon. Nest boxes in canyons impacted by LANL releases (like Guaje Canyon) would also be desirable. The nest box investigation provided measures of effect (nest occupancy rate, nest success, eggshell thickness) and measures of exposure (egg concentrations). It may also be desirable to collect information on the concentration of COPECs in food (for use in revised wildlife exposure model) as a measure of exposure. Results from the ECORSK.6 model can be used to derive estimates of population level HQs (measure of effect) for blue birds in Los Alamos and Pueblo Canyons. Field surveys of breeding birds can provide another line of evidence for adverse effects.

Summary Table for Measures Related to Avian Ground Invertevore Feeding Guild Assessment Endpoint

Line of Evidence	Cost (Low, Med, High)	Difficulty of Data Collection (Easy, Hard)	Weight of Evidence Criteria (low, med, high)
Nest box study – occupancy rate by blue birds along a gradient of COPEC concentrations in the LA/Pueblo watershed and also compare occupancy to "reference" locations – need to account for vegetation differences in the canyon as well as other factors known to influence nest site preferences [can openness of habitat be quantified?]	Low	Easy	
Nest box study – nest success rate by blue birds along a gradient of COPEC concentrations in the LA/Pueblo watershed and also compare success to "reference" locations – need to account for other factors known to influence nest success [food, predators, etc.]	Low	Easy	
Nest box study – eggshell thickness for blue birds along a gradient of COPEC concentrations in the LA/Pueblo watershed and also compare success to "reference" locations – need to account for other factors known to influence eggshell thickness [amount of calcium in diet, etc.]	Low	Hard	
Nest box study – COPEC concentrations in eggs within the LA/Pueblo watershed and also compare concentrations to "reference" locations	High	Hard	
Modeled and measured concentrations in food – could determine if exposure concentrations differ within the watershed in relation to sediment concentrations - design could use a gradient in COPEC concentrations with the LA/Pueblo watershed and also compare concentrations to "reference" locations	High	Hard	
Modeled exposure and literature toxicity information to calculate spatially weighted HQ values using ECORSK.6 [includes consideration of nesting and foraging habitat based on vegetation class coverage] for blue bird populations in the watershed – need to develop an acceptable frequency of HQ values >1 for the watershed [or population area]	Low	Easy	
Field surveys of avian ground invertevore abundance and diversity in the LA/Pueblo watershed and also compare abundance/diversity to "reference" locations	Low	Easy	
The concentration of COPECs in sediment	N/A	N/A	Low

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of avian ground invertevore feeding guild species (e.g., robin, blue bird, ash throated flycatcher, etc.)?
Line of Evidence (measure)	Nest box study – occupancy rate by blue birds along a gradient of COPEC concentrations
1) Biological linkage between assessment endpoint and measure High. Occupancy is a field measure of abundance for a representative species in the avian ground invertevore feeding guild.	
2) Correlation of stressor to response High. By looking across a gradient of concentrations changes in abundance can detected.	
3) Utility of measure for judging environmental harm Medium. No well established metrics for changes in abundance, but this may change if the Population Viability Assessment for blue birds becomes available this fall.	
4) Extent to which Data Quality Objectives are met Low. Field campaigns are vulnerable to many factors including environmental (drought) and human (vandalism). One other factor is that many of the nest boxes (upper LA, Acid, upper Pueblo Canyons) will only have one field season of data.	
5) Site-specificity High. Data represent all study reaches, which also represent all COPEC sources.	
6) Sensitivity of the measure for detecting changes Low. One field season is not expected to be document small changes in occupancy.	
7) Spatial representativeness High. Data represent all study reaches.	
8) Temporal representativeness Low. Parts of the nest box network will only have a single field season of data.	
9) Quantitativeness High. Gradients in occupancy can be evaluated against COPEC gradients [while also accounting for confounding factors [elevation, presence of water, openness of canyon].	
10) Use of a standard method Medium. Nest box studies are used but are not commonly applied to ecological effects assessments.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of avian ground invertevore feeding guild species (e.g., robin, blue bird, ash throated flycatcher, etc.)?
Line of Evidence (measure)	Nest box study – nest success rate by blue birds along a gradient of COPEC concentrations
1) Biological linkage between assessment endpoint and measure High. Nest success is a field measure of persistence for a representative species in the avian ground invertevore feeding guild.	
2) Correlation of stressor to response High. By looking across a gradient of concentrations changes in nest success can detected.	
3) Utility of measure for judging environmental harm Medium. No well established metrics for changes in nest success, but this may change if the Population Viability Assessment for blue birds becomes available this fall.	
4) Extent to which Data Quality Objectives are met Low. Field campaigns are vulnerable to many factors including environmental (drought) and human (vandalism). One other factor is that many of the nest boxes (upper LA, Acid, upper Pueblo Canyons) will only have one field season of data.	
5) Site-specificity High. Data represent all study reaches, which also represent all COPEC sources.	
6) Sensitivity of the measure for detecting changes Low. One field season is not expected to be document small changes in nest success.	
7) Spatial representativeness High. Data represent all study reaches.	
8) Temporal representativeness Low. Parts of the nest box network will only have a single field season of data.	
9) Quantitativeness High. Gradients in nest success can be evaluated against COPEC gradients [while also accounting for confounding factors [elevation, presence of water, openness of canyon].	
10) Use of a standard method Medium. Nest box studies are used but are not commonly applied to ecological effects assessments.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of avian ground invertevore feeding guild species (e.g., robin, blue bird, ash throated flycatcher, etc.)?
Line of Evidence (measure)	Nest box study – eggshell thickness for blue birds along a gradient of COPEC concentrations in the LA/Pueblo watershed
1) Biological linkage between assessment endpoint and measure Medium. Eggshell thickness is an indicator of adverse effects on reproduction and thus is not directly linked to the assessment endpoint (persistence of the avian ground invertevore feeding guild).	
2) Correlation of stressor to response High. By looking across a gradient of concentrations changes in eggshell thickness can detected.	
3) Utility of measure for judging environmental harm Low. No well established metrics for changes in eggshell thickness.	
4) Extent to which Data Quality Objectives are met Low. Field campaigns are vulnerable to many factors including environmental (drought) and human (vandalism). One other factor is that many of the nest boxes (upper LA, Acid, upper Pueblo Canyons) will only have one field season of data.	
5) Site-specificity High. Data represent all study reaches, which also represent all COPEC sources.	
6) Sensitivity of the measure for detecting changes Low. One field season is not expected to be document small changes in eggshell thickness.	
7) Spatial representativeness High. Data represent all study reaches.	
8) Temporal representativeness Low. Parts of the nest box network will only have a single field season of data.	
9) Quantitativeness Medium. Gradients in eggshell thickness can be evaluated against COPEC gradients [while also accounting for confounding factors [elevation, presence of water, openness of canyon], but biological significance must be inferred from changes in eggshell thickness.	
10) Use of a standard method Medium. Nest box studies are used but are not commonly applied to ecological effects assessments.	
Overall weight (low, medium, high)	

Effects Question	Elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of avian ground invertevore feeding guild species (e.g., robin, blue bird, ash throated flycatcher, etc.)?
Line of Evidence (measure)	Nest box study – COPEC concentrations in eggs within the LA/Pueblo watershed
1) Biological linkage between assessment endpoint and measure Medium. Egg concentrations are an indicator of exposure and thus assist in making a linkage between COPECs and adverse effects on reproduction or mortality.	
2) Correlation of stressor to response Medium. By looking across a gradient of concentrations changes in egg concentrations can be detected. Also need to consider if COPECs are being ingested by birds while they are off-site in their winter habitat.	
3) Utility of measure for judging environmental harm Low. No simple metrics for comparing egg concentrations to levels that have specific adverse effects. Need to convert egg concentration to an ingestion rate of COPECs based pharmacokinetic modeling.	
4) Extent to which Data Quality Objectives are met Low. Field campaigns are vulnerable to many factors including environmental (drought) and human (vandalism). One other factor is that many of the nest boxes (upper LA, Acid, upper Pueblo Canyons) will only have one field season of data.	
5) Site-specificity High. Data represent all study reaches, which also represent all COPEC sources.	
6) Sensitivity of the measure for detecting changes Low. One field season is not expected to be document small changes in egg concentrations.	
7) Spatial representativeness High. Data represent all study reaches.	
8) Temporal representativeness Low. Parts of the nest box network will only have a single field season of data.	
9) Quantitativeness Medium. Gradients in egg concentrations can be evaluated against COPEC gradients [while also accounting for confounding factors [elevation, presence of water, openness of canyon], but biological significance must be inferred from changes in egg concentrations.	
10) Use of a standard method Medium. Nest box studies are used but are not commonly applied to ecological effects assessments.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of avian ground invertevore feeding guild species (e.g., robin, blue bird, ash throated flycatcher, etc.)?
Line of Evidence (measure)	Modeled and measured concentrations in food
1) Biological linkage between assessment endpoint and measure Medium. Requires literature toxicity information to make inferences on potential for adverse effects.	
2) Correlation of stressor to response Medium. See answer to item 1.	
3) Utility of measure for judging environmental harm Medium. The measured concentrations in food can be divided by literature toxicity values to derive the HQ, but they only represent an indicator of adverse effects and not a direct of measure of harm.	
4) Extent to which Data Quality Objectives are met Low. Field studies with invertebrates are prone to logistical problems that may preclude meeting all DQOs. One especially problematic area has been getting adequate detection limits for organic chemicals, which represent key COPECs in the LA/Pueblo watershed.	
5) Site-specificity Medium. Prey information is site-specific but toxicity information is not.	
6) Sensitivity of the measure for detecting changes N/A	
7) Spatial representativeness Medium. Spatial variation in invertebrate density/species composition was shown to be high in the LA/Guaje Baseline report.	
8) Temporal representativeness Low. Invertebrate sampling will necessarily represent a snapshot in time. Seasonal changes in body burdens and species composition are expected to be large. Effects of the drought may also be manifested in data collected.	
9) Quantitativeness High. Develop statistical relationship between invertebrate concentrations and sediment concentrations.	
10) Use of a standard method Low. Invertebrate concentration studies are not standardized.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of avian ground invertevore feeding guild species (e.g., robin, blue bird, ash throated flycatcher, etc.)?
Line of Evidence (measure)	Modeled exposure and literature toxicity information to calculate spatially weighted HQ values using ECORSK.6 for blue bird populations
1) Biological linkage between assessment endpoint and measure Low. The model is based on foraging characteristics of a selected species (e.g., blue bird) and literature information on toxicity. The toxicity information is from avian studies, and is relevant to the evaluation of adverse effects on blue birds. This ranks low because empirical data cannot be collected to evaluate the effects question.	
2) Correlation of stressor to response The linkage between the assessment endpoint and measure is low.	
3) Utility of measure for judging environmental harm Medium. HQs are well-accepted methodology, but they only represent an indicator of adverse effects and not a direct of measure of harm.	
4) Extent to which Data Quality Objectives are met N/A	
5) Site-specificity Medium. Foraging information is site-specific but toxicity information is not.	
6) Sensitivity of the measure for detecting changes N/A	
7) Spatial representativeness High. Model area will include the entire watershed.	
8) Temporal representativeness N/A.	
9) Quantitativeness Medium. Quantitative, but not a statistical relationship [unless dose-response relationships can be used in place of TRVs].	
10) Use of a standard method Medium. HQs are standard but the model itself [ECORSK.6] has been used only at LANL.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of avian ground invertevore feeding guild species (e.g., robin, blue bird, ash throated flycatcher, etc.)?
Line of Evidence (measure)	Field surveys of avian ground invertevore abundance and diversity in the LA/Pueblo watershed
1) Biological linkage between assessment endpoint and measure High. Field measure of species diversity and abundance.	
2) Correlation of stressor to response High. By looking across a gradient of concentrations changes in abundance/diversity can detected.	
3) Utility of measure for judging environmental harm Low. No well established metrics for changes in species abundance/diversity.	
4) Extent to which Data Quality Objectives are met Low. Field campaigns are vulnerable to many factors including environmental (drought). Field point counts are highly variable measures of abundance/diversity.	
5) Site-specificity Medium. Data represent many study reaches, to include all COPEC sources.	
6) Sensitivity of the measure for detecting changes Low. Three sets of point counts in one field season are not expected to be document small changes in diversity/abundance.	
7) Spatial representativeness Medium. Data collected at representative study reaches.	
8) Temporal representativeness Low. Only three sets of point counts in one field season.	
9) Quantitativeness Low. Gradients in diversity/abundance can be evaluated against COPEC gradients [while also accounting for confounding factors [elevation, presence of water, openness of canyon].	
10) Use of a standard method Low. Species point counts are not commonly applied to ecological effects assessments.	
Overall weight (low, medium, high)	

Assessment endpoint description Mammalian invertevore feeding guild – the shrew is used as screening receptor for this feeding guild.

Assessment endpoint attributes Decreased population abundance or persistence and species diversity.
Effects Question Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of mammalian invertevore feeding guild species (e.g., shrew, deer mouse, harvest mouse, brush mouse, etc.)?
Societal relevance Mammalian invertevores tend to be small and are frequently nocturnal species. Thus, they are fairly cryptic members of the fauna. In addition, small mammals may carry diseases for humans (e.g., hantavirus), which also tend to reduce their societal importance.
Ecological relevance Ecological relevance is implied by selecting a speciose and abundant feeding guild (mammalian invertevore). Small mammals also represent an important food source for higher trophic levels.
Susceptibility to hazardous agent Some of the COPECs in Los Alamos and Pueblo Canyons are bioaccumulative, persistent, and toxic chemicals (e.g., PCBs). PCBs are especially known for their impacts on reproduction. Mammals are also potentially susceptible to several metals, but this is dependent on the metals being present in a bioavailable form.
Accessibility to prediction and measurement The screening receptor – the vagrant shrew – is expected to be only locally common in Los Alamos and Pueblo Canyons in areas with persistent surface water flow. Such areas exist in upper Los Alamos Canyon below the reservoir, Pueblo Canyon below the WWTP outfall, and in lower Los Alamos Canyon (Basalt Spring and downstream of Guaje Canyon. Other small mammals (e.g., deer mouse, harvest mouse) are similar in terms of body weight, home range size, and food intake rate, but do not specialize on invertebrates to the degree that shrews specialize. Field measures of effects could include small mammal abundance and diversity. Reproduction can also be measured to determine the potential for population effects. It may also be desirable to collect information on the concentration of COPECs in food (for use in revised wildlife exposure model) as a measure of exposure. Results from the ECORSK.6 model can be used to derive estimates of population level HQs (measure of effect) for selected small mammal species (e.g., deer mice) in Los Alamos and Pueblo Canyons.

Summary Table for Measures Related to Mammalian Invertevore Assessment Endpoint

Line of Evidence	Cost (Low, Med, High)	Difficulty of Data Collection (Easy, Hard)	Weight of Evidence Criteria (low, med, high)
Field surveys of small mammal abundance and diversity along gradient of COPEC concentrations in the LA/Pueblo watershed and also compare abundance/diversity to "reference" locations	Med	Hard	
Field surveys to determine small mammal reproduction rates along gradient of COPEC concentrations in the LA/Pueblo watershed and also compare reproduction rates to "reference" locations	Med	Hard	
Modeled and measured concentrations in food – could determine if exposure concentrations differ within the watershed in relation to sediment concentrations - design could use a gradient in COPEC concentrations with the LA/Pueblo watershed and also compare concentrations to "reference" locations	High	Hard	
Modeled exposure and literature toxicity information to calculate spatially weighted HQ values using ECORSK.6 [includes consideration of nesting and foraging habitat based on vegetation class coverage] for deer mouse populations in the watershed – need to develop an acceptable frequency of HQ values >1 for the watershed [or population area]	Low	Easy	
The concentration of COPECs in sediment	N/A	N/A	Low

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of mammalian invertevore feeding guild species (e.g., shrew, deer mouse, harvest mouse, brush mouse, etc.)?
Line of Evidence (measure)	Field surveys of small mammal abundance and diversity along gradient of COPEC concentrations in the LA/Pueblo watershed
1) Biological linkage between assessment endpoint and measure High. Field measure of species diversity and abundance.	
2) Correlation of stressor to response High. By looking across a gradient of concentrations changes in abundance/diversity can detected.	
3) Utility of measure for judging environmental harm Low. No well established metrics for changes in species abundance/diversity.	
4) Extent to which Data Quality Objectives are met Low. Field campaigns are vulnerable to many factors including environmental (drought). Small mammal abundance/diversity is typically highly variable.	
5) Site-specificity Medium. Data collected at four representative study reaches, to include key COPEC sources for adverse effects on small mammals.	
6) Sensitivity of the measure for detecting changes Low. Two sets of mammal trapping data in one field season are not expected to be document small changes in diversity/abundance.	
7) Spatial representativeness Medium. Data collected at representative study reaches.	
8) Temporal representativeness Low. Only two sets of mammal trapping data in one field season.	
9) Quantitativeness Low. Gradients in diversity/abundance can be evaluated against COPEC gradients [while also accounting for confounding factors [elevation, presence of water].	
10) Use of a standard method Low. Small mammal species/abundance measures are not commonly applied to ecological effects assessments.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of mammalian invertevore feeding guild species (e.g., shrew, deer mouse, harvest mouse, brush mouse, etc.)?
Line of Evidence (measure)	Field surveys to determine small mammal reproduction rates along gradient of COPEC concentrations in the LA/Pueblo watershed
1) Biological linkage between assessment endpoint and measure High. Field measure of persistence and population viability.	
2) Correlation of stressor to response High. By looking across a gradient of concentrations changes in reproduction can detected.	
3) Utility of measure for judging environmental harm Low. No well established metrics for changes in reproduction.	
4) Extent to which Data Quality Objectives are met Low. Field campaigns are vulnerable to many factors including environmental (drought). Small mammal reproduction is typically highly variable (e.g., many litters in a productive year).	
5) Site-specificity Medium. Data collected at four representative study reaches, to include key COPEC sources for adverse effects on small mammals.	
6) Sensitivity of the measure for detecting changes Low. Two sets of mammal trapping data in one field season are not expected to be document small changes in reproduction.	
7) Spatial representativeness Medium. Data collected at representative study reaches.	
8) Temporal representativeness Low. Only two sets of mammal trapping data in one field season.	
9) Quantitativeness Low. Gradients in reproduction can be evaluated against COPEC gradients [while also accounting for confounding factors [elevation, presence of water].	
10) Use of a standard method Low. Small mammal reproduction measures are not commonly applied to ecological effects assessments.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of mammalian invertevore feeding guild species (e.g., shrew, deer mouse, harvest mouse, brush mouse, etc.)?
Line of Evidence (measure)	Modeled and measured concentrations in food
1) Biological linkage between assessment endpoint and measure Medium. Requires literature toxicity information to make inferences on potential for adverse effects.	
2) Correlation of stressor to response Medium. See answer to item 1.	
3) Utility of measure for judging environmental harm Medium. The measured concentrations in food can be divided by literature toxicity values to derive the HQ, but they only represent an indicator of adverse effects and not a direct of measure of harm.	
4) Extent to which Data Quality Objectives are met Low. Field studies with invertebrates are prone to logistical problems that may preclude meeting all DQOs. One especially problematic area has been getting adequate detection limits for organic chemicals, which represent key COPECs in the LA/Pueblo watershed.	
5) Site-specificity Medium. Prey information is site-specific but toxicity information is not.	
6) Sensitivity of the measure for detecting changes N/A	
7) Spatial representativeness Medium. Spatial variation in invertebrate density/species composition was shown to be high in the LA/Guaje Baseline report.	
8) Temporal representativeness Low. Invertebrate sampling will necessarily represent a snapshot in time. Seasonal changes in body burdens and species composition are expected to be large. Effects of the drought may also be manifested in data collected.	
9) Quantitativeness High. Develop statistical relationship between invertebrate concentrations and sediment concentrations.	
10) Use of a standard method Low. Invertebrate concentration studies are not standardized.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased species diversity, population abundance and/or persistence of mammalian invertevore feeding guild species (e.g., shrew, deer mouse, harvest mouse, brush mouse, etc.)?
Line of Evidence (measure)	Modeled exposure and literature toxicity information to calculate spatially weighted HQ values using ECORSK.6 for deer mouse populations
1) Biological linkage between assessment endpoint and measure Low. The model is based on foraging characteristics of a selected species (e.g., deer mouse) and literature information on toxicity. The toxicity information is from avian studies, and is relevant to the evaluation of adverse effects on blue birds. This ranks low because empirical data cannot be collected to evaluate the effects question.	
2) Correlation of stressor to response The linkage between the assessment endpoint and measure is low.	
3) Utility of measure for judging environmental harm Medium. HQs are well-accepted methodology, but they only represent an indicator of adverse effects and not a direct of measure of harm.	
4) Extent to which Data Quality Objectives are met N/A	
5) Site-specificity Medium. Foraging information is site-specific but toxicity information is not.	
6) Sensitivity of the measure for detecting changes N/A	
7) Spatial representativeness High. Model area will include the entire watershed.	
8) Temporal representativeness N/A.	
9) Quantitativeness Medium. Quantitative, but not a statistical relationship [unless dose-response relationships can be used in place of TRVs].	
10) Use of a standard method Medium. HQs are standard but the model itself [ECORSK.6] has been used only at LANL.	
Overall weight (low, medium, high)	

Assessment endpoint description Detritivores - invertebrate, *a.k.a.* earthworm used as screening receptor for this feeding guild.

Assessment endpoint attributes Nutrient cycling rates
Effects Question Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased rates of nutrient cycling?
Societal relevance Detritivory and ecological function it serves are little known or understood by the general population. The subpopulation that gardens or composts is more informed in the role that detritivores play.
Ecological relevance Detritivores serve an essential ecological function in making macro- and micronutrients available for plants and animals in the food web.
Susceptibility to hazardous agent Detritivores such as earthworms are known to be sensitive to a variety of contaminants. However, the impact of COPECs on nutrient cycling is an important data gap.
Accessibility to prediction and measurement Rates of nutrient cycling (decomposition) can be measured with litter bag experiments for a measure of effect. Abundance and diversity of earthworms can be quantified as another measure of effect. The concentration of COPECs in earthworms can be quantified as a measure of exposure. Information on plant community is an important ecosystem measure to evaluate the potential importance of earthworms or other detrivivores in various parts of Los Alamos and Pueblo Canyons.

Summary Table for Measures Related to Detritivore Assessment Endpoint

Line of Evidence	Cost (Low, Med, High)	Difficulty of Data Collection (Easy, Hard)	Weight of Evidence Criteria (low, med, high)
Toxicity bioassay [earthworm mortality] along gradient of COPEC concentrations in the LA/Pueblo watershed and also compare mortality rates to "reference" locations	High	Easy	
Field information on rates of decomposition [using litter bags] along gradient of COPEC concentrations in the LA/Pueblo watershed and also compare decomposition rates to "reference" locations	Med	Easy	
Abundance and diversity of earthworms along gradient of COPEC concentrations in the LA/Pueblo watershed and also compare earthworm abundance/diversity to "reference" locations [would need information on the plant communities to make this a meaningful comparison]	Low	Hard	
The concentration of COPECs in earthworms	High	Hard	
The concentration of COPECs in sediment	N/A	N/A	Low

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased rates of nutrient cycling?
Line of Evidence (measure)	Toxicity bioassay [earthworm mortality] along gradient of COPEC concentrations in the LA/Pueblo watershed
1) Biological linkage between assessment endpoint and measure Medium. Earthworm mortality is a laboratory measure of adverse effects on an important detritivore group.	
2) Correlation of stressor to response High. This information is readily obtainable from a laboratory toxicity bioassay.	
3) Utility of measure for judging environmental harm Medium. Effects are documented via statistical changes in germination that can be linked to changes in nutrient cycling.	
4) Extent to which Data Quality Objectives are met High. Should be able to meet DQOs in a standard laboratory toxicity bioassay.	
5) Site-specificity High. Sediments representative of the COPECs in the canyons will be tested.	
6) Sensitivity of the measure for detecting changes Medium. Good because of a controlled environment. May have some extrapolation to field conditions.	
7) Spatial representativeness High. Twelve representative reaches are selected.	
8) Temporal representativeness N/A	
9) Quantitativeness Medium. Statistical tests used, and only difficulty is translating statistical significance to changes in earthworm mortality. This can be enhanced by looking across a gradient of COPEC concentrations.	
10) Use of a standard method High. Will use ASTM method.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased rates of nutrient cycling?
Line of Evidence (measure)	Field information on rates of decomposition [using litter bags] along gradient of COPEC concentrations in the LA/Pueblo watershed
1) Biological linkage between assessment endpoint and measure High. Litter bags are field measure of nutrient cycling.	
2) Correlation of stressor to response High. By looking across a gradient of concentrations changes in rates of decomposition can detected.	
3) Utility of measure for judging environmental harm Low. No well established metrics for changes in rates of decomposition.	
4) Extent to which Data Quality Objectives are met Low. Field campaigns are vulnerable to many factors including environmental (drought). Rates of decomposition are expected to be variable seasonally and spatially – thus getting a representative set of data may be difficult.	
6) Sensitivity of the measure for detecting changes Low. Two sets of mammal trapping data in one field season are not expected to be document small changes in reproduction.	
7) Spatial representativeness Medium. Litter bag decomposition evaluated at representative study reaches.	
8) Temporal representativeness Low. Only one set of litter bags over the field season.	
9) Quantitativeness Low. Gradients in decomposition can be evaluated against COPEC gradients [while also accounting for confounding factors [elevation, presence of water].	
10) Use of a standard method Low. Decomposition measures are not commonly applied to ecological effects assessments.	
6) Sensitivity of the measure for detecting changes Low. One set of litter bag experiments in one field season is not expected to be document small changes in decomposition.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased rates of nutrient cycling?
Line of Evidence (measure)	Abundance and diversity of earthworms along gradient of COPEC concentrations in the LA/Pueblo watershed
1) Biological linkage between assessment endpoint and measure Medium. Field measure of one key taxonomic group responsible for decomposition, but would not represent more important species in dry habitats (e.g., mites).	
2) Correlation of stressor to response Medium. By looking across a gradient of concentrations changes in earthworm abundance/diversity can detected [but confounding factor of moisture inhibits this analysis]	
3) Utility of measure for judging environmental harm Low. No well established metrics for changes in earthworm species abundance/diversity. Would need to exclude herbivorous worms (like night crawlers from the assessment).	
4) Extent to which Data Quality Objectives are met Low. Field campaigns are vulnerable to many factors including environmental (drought).	
5) Site-specificity Medium. Data collected at representative study reaches, to include key COPEC sources for adverse effects on detritivores.	
6) Sensitivity of the measure for detecting changes Low. One set of data in one field season is not expected to be document small changes in diversity/abundance.	
7) Spatial representativeness Medium. Data collected at representative study reaches.	
8) Temporal representativeness Low. Only one sets of data in one field season.	
9) Quantitativeness Low. Gradients in diversity/abundance can be evaluated against COPEC gradients [while also accounting for confounding factors [elevation, presence of water].	
10) Use of a standard method Low. Earthworm species/abundance measures are not commonly applied to ecological effects assessments.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased rates of nutrient cycling?
Line of Evidence (measure)	Use the concentration of COPECs as a measure of exposure
1) Biological linkage between assessment endpoint and measure Low. Concentrations in invertebrates would be only indirectly linked to decreases in decomposition rates.	
2) Correlation of stressor to response Low. See answer to item 1.	
3) Utility of measure for judging environmental harm Low. No criteria exist for this measure.	
4) Extent to which Data Quality Objectives are met Based on the answers to items 1-3, this measure should not be characterized.	
5) Site-specificity Based on the answers to items 1-3, this measure should not be characterized.	
6) Sensitivity of the measure for detecting changes Based on the answers to items 1-3, this measure should not be characterized.	
7) Spatial representativeness Based on the answers to items 1-3, this measure should not be characterized.	
8) Temporal representativeness Based on the answers to items 1-3, this measure should not be characterized.	
9) Quantitativeness Based on the answers to items 1-3, this measure should not be characterized.	
10) Use of a standard method Based on the answers to items 1-3, this measure should not be characterized.	
Overall weight (low, medium, high)	

Assessment endpoint description
Primary producers [*a.k.a.* plants]

Assessment endpoint attributes Native plant species presence/absence, diversity
Effects Question Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased native plant species diversity and the absence of certain native plant species? [second part is ambiguous – what species may be absent]
Societal relevance Plants are an obvious and critical component of the terrestrial food web.
Ecological relevance Plants form the base for the terrestrial food web. Plants provide the biological structure (habitat) for many species (e.g., nesting locations for birds).
Susceptibility to hazardous agent Plants are mainly susceptible to metal COPECs. Some of these metals are fairly ubiquitous in post-Cerro Grande fire deposits.
Accessibility to prediction and measurement The plant germination test [% germination, biomass {height} – is OM a confounding factor?] is a potential measure of effect. The root elongation test is an alternate toxicity bioassay, but is not recommended because the endpoint tested is less directly related to the effects question. (Consideration of toxicity bioassays: toxicity tests require extrapolation to relate results [% germination] to an attribute like plant diversity.) Field measures of abundance/diversity are also possible as a measure of effect. Measures of exposure include concentrations of COPECs in the rooting zone for various plant species. The concentration of a COPEC in plant tissue is a more direct measure of exposure. Because plant species change over the elevational gradient – elevation is an important measure of ecosystem characteristics. Another aspect of ecosystem characteristics is the point in time along a succession series – it may be possible to relate geomorphic units to succession (geomorphic units sometimes based on plant cover – e.g., reach P-4, can we compare plant communities with different levels of COPECs but same point in the successional sequence).

Summary Table for Measures Related to Primary Producer Assessment Endpoint

Line of Evidence	Cost (Low, Med, High)	Difficulty of Data Collection (Easy, Hard)	Weight of Evidence Criteria (low, med, high)
Toxicity bioassay [seedling germination] along gradient of COPEC concentrations in the LA/Pueblo watershed and also compare germination rates to "reference" locations	High	Easy	
Abundance and diversity of plants along gradient of COPEC concentrations in the LA/Pueblo watershed and also compare plant abundance/diversity to "reference" locations [need to consider expected changes in abundance/diversity with elevational changes]	Low	Easy	
The concentration of COPECs in plants	High	Hard	
The concentration of COPECs in sediment	N/A	N/A	Low

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased native plant species diversity and the absence of certain native plant species? [second part is ambiguous – what species may be absent]
Line of Evidence (measure)	Toxicity bioassay [seedling germination] along gradient of COPEC concentrations in the LA/Pueblo watershed
1) Biological linkage between assessment endpoint and measure High. Seedling germination is a laboratory measure of regeneration.	
2) Correlation of stressor to response High. This information is readily obtainable from a laboratory toxicity bioassay.	
3) Utility of measure for judging environmental harm Medium. Effects are documented via statistical changes in germination that can be linked to changes in plant regeneration.	
4) Extent to which Data Quality Objectives are met High. Should be able to meet DQOs in a standard laboratory toxicity bioassay.	
5) Site-specificity High. Sediments representative of the COPECs in the canyons will be tested.	
6) Sensitivity of the measure for detecting changes Medium. Good because of a controlled environment. May have some extrapolation to field conditions.	
7) Spatial representativeness High. Twelve representative reaches are selected.	
8) Temporal representativeness N/A	
9) Quantitativeness Medium. Statistical tests used, and only difficulty is translating statistical significance to changes in plant regeneration. This can be enhanced by looking across a gradient of COPEC concentrations.	
10) Use of a standard method High. Will use ASTM method.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased native plant species diversity and the absence of certain native plant species? [second part is ambiguous – what species may be absent]
Line of Evidence (measure)	Abundance and diversity of plants along gradient of COPEC concentrations in the LA/Pueblo watershed
1) Biological linkage between assessment endpoint and measure High. Field measure of abundance/diversity.	
2) Correlation of stressor to response High. By looking across a gradient of concentrations changes in abundance/diversity can detected.	
3) Utility of measure for judging environmental harm Low. No well established metrics for changes in abundance/diversity.	
4) Extent to which Data Quality Objectives are met Medium. Field campaigns are vulnerable to many factors including environmental (drought), but some plants (shrubs/trees) are vulnerable than wildlife.	
5) Site-specificity Medium. Data collected at 12 representative study reaches, to include key COPEC sources for adverse effects on plants.	
6) Sensitivity of the measure for detecting changes Medium. Quadrats provide quantitative measures for detecting moderate changes in abundance/diversity.	
7) Spatial representativeness Medium. Data collected at representative study reaches.	
8) Temporal representativeness Medium. Do not expect large changes in plants over time.	
9) Quantitativeness Low. Gradients in abundance/diversity can be evaluated against COPEC gradients [while also accounting for confounding factors [elevation, presence of water].	
10) Use of a standard method Low. Plant population measures are not commonly applied to ecological effects assessments.	
Overall weight (low, medium, high)	

Effects Question	Do elevated concentrations of COPECs in sediments in Los Alamos and Pueblo Canyons lead to decreased native plant species diversity and the absence of certain native plant species? [second part is ambiguous – what species may be absent]
Line of Evidence (measure)	The concentration of COPECs in plants
1) Biological linkage between assessment endpoint and measure Low. Concentrations in plants would be only indirectly linked to decreases in abundance/diversity.	
2) Correlation of stressor to response Low. See answer to item 1.	
3) Utility of measure for judging environmental harm Low. No criteria exist for this measure.	
4) Extent to which Data Quality Objectives are met Based on the answers to items 1-3, this measure should not be characterized.	
5) Site-specificity Based on the answers to items 1-3, this measure should not be characterized.	
6) Sensitivity of the measure for detecting changes Based on the answers to items 1-3, this measure should not be characterized.	
7) Spatial representativeness Based on the answers to items 1-3, this measure should not be characterized.	
8) Temporal representativeness Based on the answers to items 1-3, this measure should not be characterized.	
9) Quantitativeness Based on the answers to items 1-3, this measure should not be characterized.	
10) Use of a standard method Based on the answers to items 1-3, this measure should not be characterized.	
Overall weight (low, medium, high)	

Weight of Evidence Criteria (1)

Attributes Related to Strength of Association Between Assessment and Measurement Endpoints

1) Biological linkage between measurement endpoint and assessment endpoint.
This attribute refers to the extent to which the measurement endpoint is representative of, and correlated with, or applicable to the assessment endpoint. If there is no biological linkage between a measurement endpoint (e.g., a study that may have been performed for some other purpose) and the assessment endpoint of interest, then that study should not be used to evaluate the stated assessment endpoint. Biological linkage pertains to similarity of effect, target organ, mechanism of action, and level of ecological organization.

2) Correlation of stressor to response
This attribute relates the ability of the endpoint to demonstrate effect from chronic exposure to the stressor and to correlate effects with the degree of exposure. As such, this attribute also takes into consideration the susceptibility of the receptor and the magnitude of effects observed.

3) Utility of measure for judging environmental harm
This attribute relates the ability to judge results of the study against well-accepted standards, criteria, or objective measures. As such, the attribute describes the applicability, certainty, and scientific basis of the measure, as well as the sensitivity of a benchmark in detecting environmental harm. Examples of objective standards or measure for judgment might include ambient water quality criteria, sediment quality criteria, biological indices, and toxicity or exposure thresholds recognized by the scientific or regulatory community as measures of environmental harm.

Attributes Related to Data Quality

4) Extent to which Data Quality Objectives are met
This attribute reflects the degree to which data quality objectives are designated that are comprehensive and rigorous, as well as the extent to which they are met. Data quality objectives should clearly evaluate the appropriateness of data collection and analysis practices. If any data quality objectives are not met, the reason for not meeting them and the potential impact on the overall assessment should be clearly documented.

Attributes Related to Study Design and Execution

5) Site-specificity
This attribute relates the extent to which chemical and biological data, environmental media, species, environmental conditions, benchmark (or reference), and habitat types that are used in the measurement endpoint reflect the site of interest.

6) Sensitivity of the measurement endpoint for detecting changes
This attribute relates to the ability to detect a response in the measurement endpoint, expressed as the percentage of the total possible variability that the endpoint is able to detect. Additionally, this attribute reflects the ability of the measurement endpoint to discriminate between responses to a stressor and those resulting from natural or design variability and uncertainty.

7) Spatial representativeness
This attribute relates to the degree of compatibility or overlap between the study area, locations of measurements or samples, locations of stressors, and locations of ecological receptors and their potential exposure.

8) Temporal representativeness
This attribute relates to the temporal compatibility or overlap between the measurement endpoint (when data were collected or the period for which data are representative) and the period during which effects of concern would be likely to be detected. Also linked to this attribute is the number of measurement or sampling events over time and the expected variability over time.

9) Quantitativeness
This attribute relates to the degree to which numbers can be used to describe the magnitude of response of the measurement endpoint to the stressor, as well as whether results are objective or subjective, whether the results are sufficient to test for statistical significance, and whether biological significance can be inferred from statistical significance.

10) Use of a standard method
The extent to which the study follows standard protocols recommended by a recognized scientific authority for conducting the method correctly. Examples of standard methods are study designs or chemical measures published in the Federal Register of the Code of Federal Regulations, developed by ASTM, or repeatedly published in the peer reviewed scientific literature, including impact assessments, field surveys, toxicity tests, benchmark approaches, toxicity quotients, and tissue residue analyses. This attribute also reflects the suitability and applicability of the method to the endpoint and the site, as well as the need for modification of the method.

(1) Menzie et al. (1996)

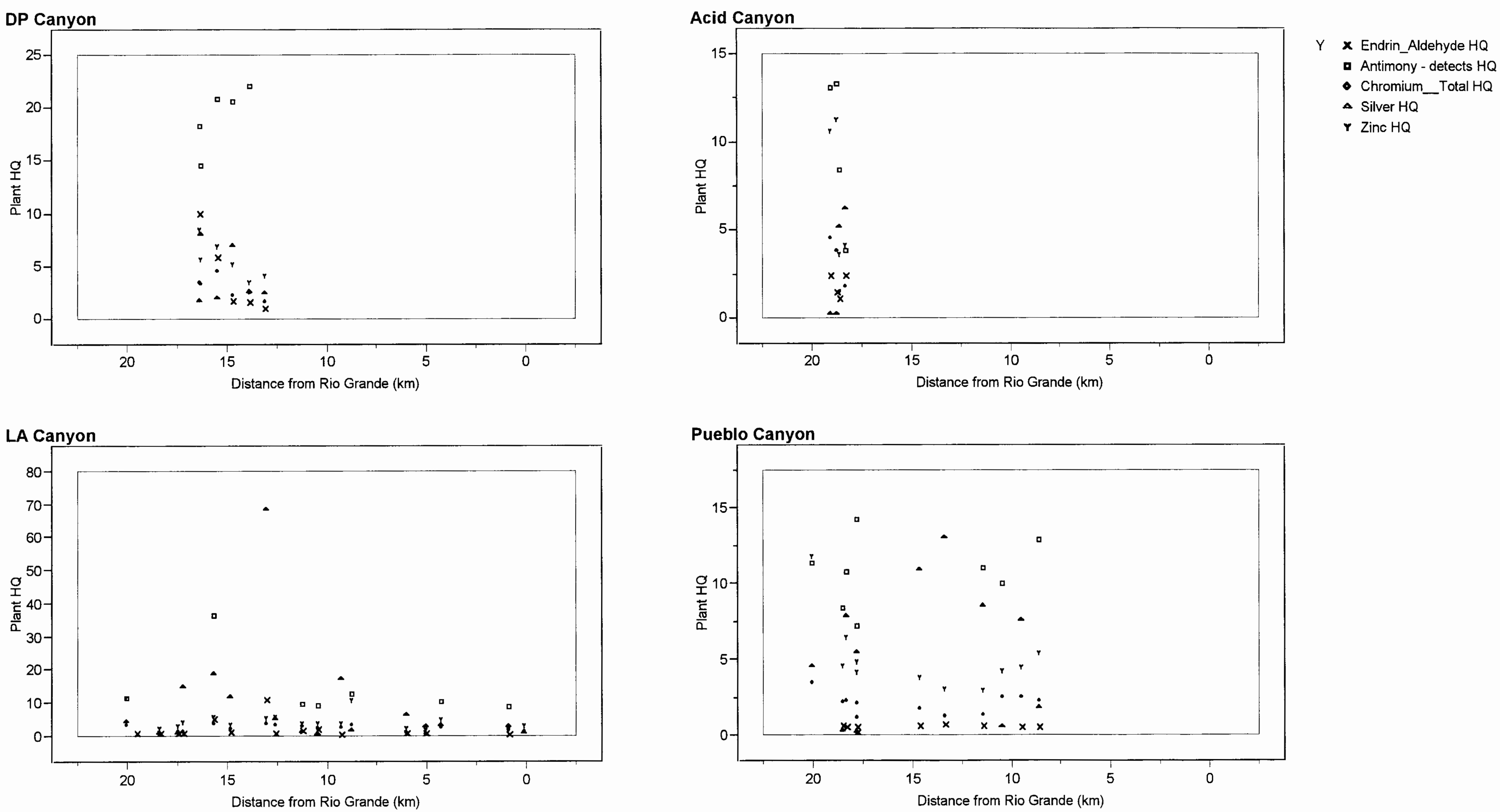
	AC vs bkg		DPC vs bkg		LLAC vs bkg		LLAC-post vs bkg		LLA-post vs ash		PC vs bkg		PC-post vs bkg		PC-post vs ash		ULAC vs bkg		ULAC-post vs bkg		ULAC-post vs ash	
Analyte	Z *	Prob>|Z|	Z *	Prob>|Z|	Z *	Prob>|Z|	Z *	Prob>|Z|	Z *	Prob>|Z|	Z *	Prob>|Z|	Z *	Prob>|Z|	Z *	Prob>|Z|	Z *	Prob>|Z|	Z *	Prob>|Z|	Z *	Prob>|Z|
Antimony (1)									1.083	0.2787									3.895	<.0001	0.472	0.6366
Arsenic	-1.797	0.0724	-0.08	0.936	3.88	0.0001	-1.215	0.2245	3.582	0.0003	1.002	0.3165	-0.801	0.4232	3.772	0.0002	0.452	0.6511	-1.506	0.1321	1.228	0.2193
Barium	0.325	0.7455	0.726	0.468	-0.048	0.9617	-3.604	0.0003	3.247	0.0012	0.867	0.3859	-4.101	<.0001	3.756	0.0002	1.083	0.2787	-3.189	0.0014	1.228	0.2193
Cadmium	2.392	0.0167	2.558	0.0105	-1.091	0.2754	2.684	0.0073	3.471	0.0005	-2.531	0.0114	1.283	0.1996	4.144	<.0001	1.312	0.1895	-3.248	0.0012	2.173	0.0298
Chromium__Total	-0.895	0.371	-0.523	0.6007	2.933	0.0034	-0.515	0.6065	2.464	0.0137	2.044	0.0409	0.782	0.434	3.082	0.0021	-0.542	0.588	-2.672	0.0075	-0.574	0.5663
Cobalt	-2.006 (3	0.0448	-1.219	0.2228	0.321	0.7484	-3.961	<.0001	2.58	0.0099	-0.764	0.4447	-4.102	<.0001	2.809	0.005	0.52	0.6034	-3.19	0.0014	-0.095	0.9244
Copper	-3.175	0.0015	-4.599	<.0001	-0.785	0.4323	-3.691	0.0002	3.549	0.0004	-3.965	<.0001	-3.522	0.0004	4.092	<.0001	-3.665	0.0002	-3.189	0.0014	1.326	0.1849
Cyanide__Total	0.242	0.8084	1.047	0.2949	0.138	0.8905	-3.566	0.0004			-0.494	0.6216	.	0			3.584	0.0003	-2.275	0.0229		
Lead	-4.949	<.0001	-6.394	0	-0.313	0.7546	-2.833	0.0046	3.624	0.0003	-4.986	<.0001	-4.544	<.0001	4.077	<.0001	-5.01	<.0001	-3.19	0.0014	1.417	0.1564
Manganese	-0.447	0.6547	2.834	0.0046	3.685	0.0002	-3.42	0.0006	3.618	0.0003	-0.39	0.6968	-4.569	<.0001	4.027	<.0001	3.239	0.0012	-3.189	0.0014	1.606	0.1082
Mercury	-2.264	0.0235	-1.429	0.153	0.175	0.8614	1.732	0.0833	0.523	0.6013	-3.388	0.0007	-2.796	0.0052	-1.461	0.1441	-3.378	0.0007	-4.669	<.0001	-2.551	0.0107
Methylmercury__1__Ion											.	0										
Selenium	-3.491	0.0005	-3.378	0.0007	0.98	0.3273	0.822	0.411	2.426	0.0153	-1.963	0.0497	-4.198	<.0001	1.445	0.1485	-3.475	0.0005	-5.123	<.0001	-0.283	0.7768
Silver	2.816	0.0049	-0.282	0.778	-0.932	0.3513	2.944	0.0032	2.127	0.0334	-2.595	0.0095	5.75	<.0001	3.835	0.0001	-2.083	0.0372	0.163	0.8708	1.039	0.2986
Thallium (1)									3.623	0.0003									1.951	0.0511	1.614	0.1066
Titanium	0.914	0.3606	1.595	0.1107	1.332	0.183					0.924	0.3556					1.205	0.2282				
Total_Uranium_by_ICPMS																	5.942	<.0001				
Uranium (2)	-2.304	0.0212	-1.626	0.1039	-5.249	<.0001					-6.005	0					-5.391	<.0001				
Zinc	-3.333	0.0009	-4.622	<.0001	3.493	0.0005	-1.998	0.0457	3.469	0.0005	-3.037	0.0024	-0.973	0.3306	4.14	<.0001	-1.782	0.0747	-3.189	0.0014	0.189	0.8498

* if Z<0 means that background is less than canyon sample results, cells with significant difference are highlighted

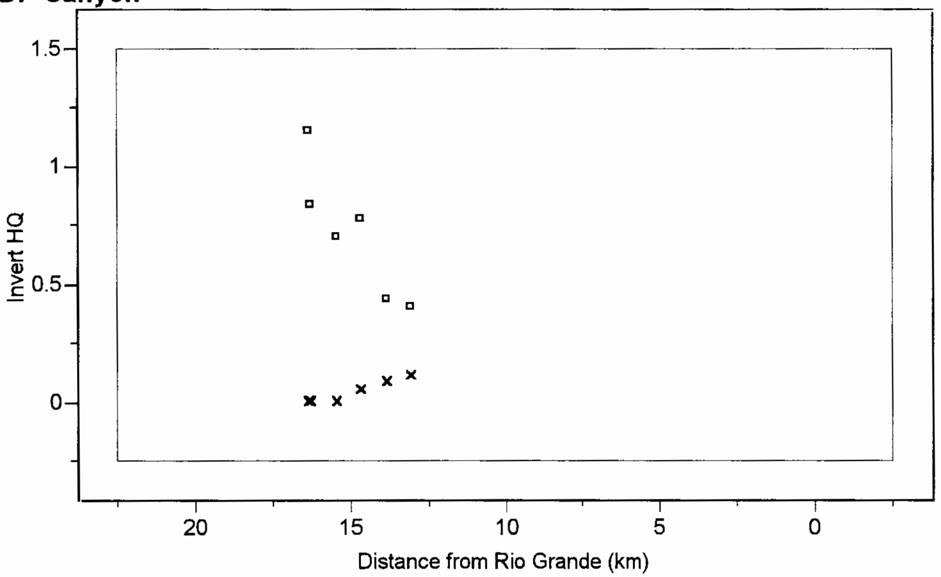
(1) statistical tests vs background not used because of detection limits in background data for these metals

(2) some confusion exists in the working data over the uranium method, e.g., the LLA uranium are U-total so not different from background

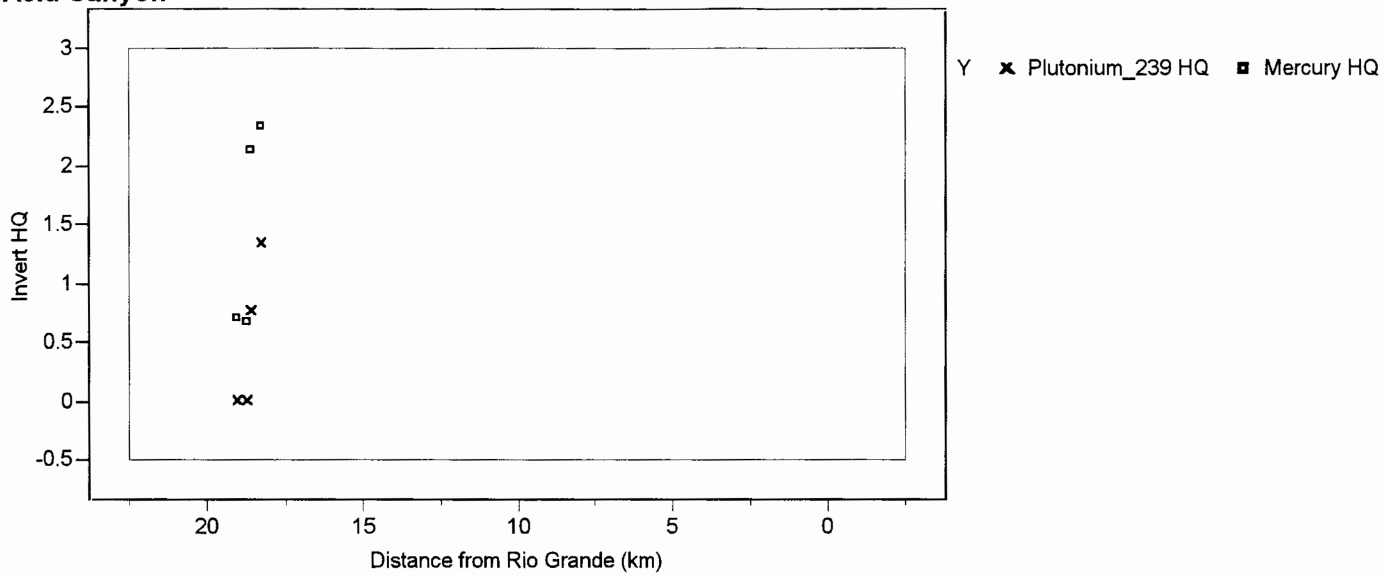
(3) cobalt is greater than background in reaches AC-1 and AC-2, but not ACS or AC-3


DP Canyon
Plant HQ
25
20
15
10
5
0
20
15
10
5
0
Distance from Rio Grande (km)
Acid Canyon
Plant HQ
15
10
5
0
20
15
10
5
0
Distance from Rio Grande (km)
Y
Endrin_Aldehyde HQ
Antimony - detects HQ
Chromium__Total HQ
Silver HQ
Zinc HQ
LA Canyon
Plant HQ
80
70
60
50
40
30
20
10
0
20
15
10
5
0
Distance from Rio Grande (km)
Pueblo Canyon
Plant HQ
15
10
5
0
20
15
10
5
0
Distance from Rio Grande (km)

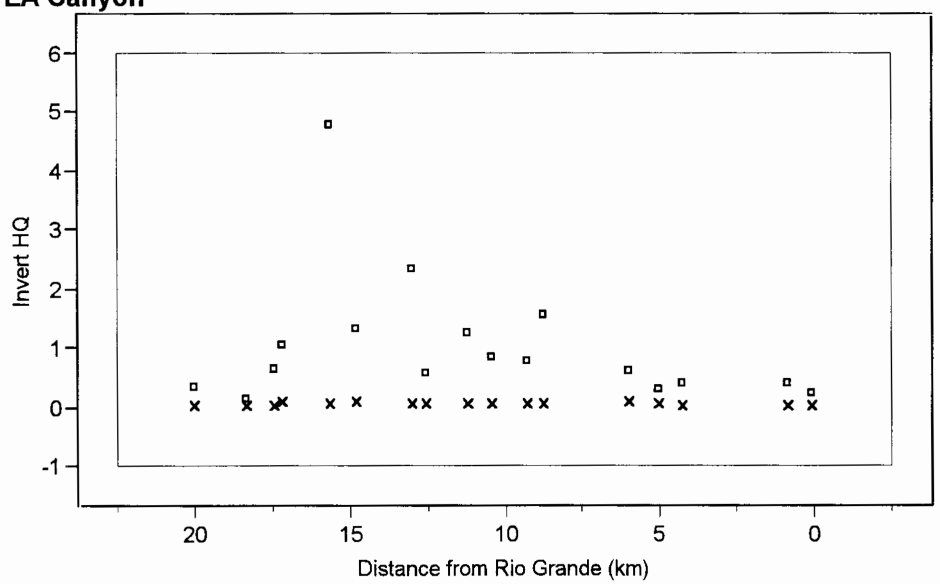
DP Canyon



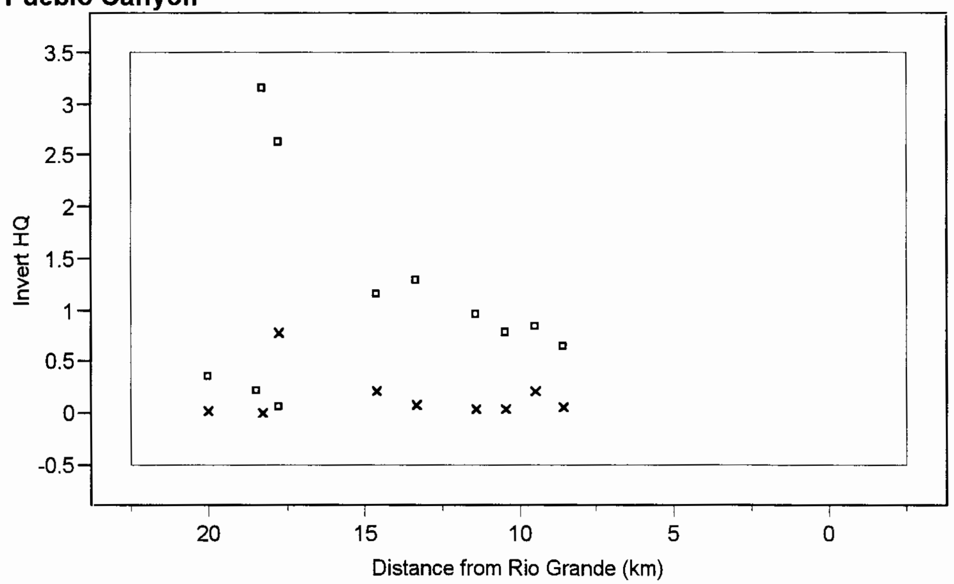
Acid Canyon



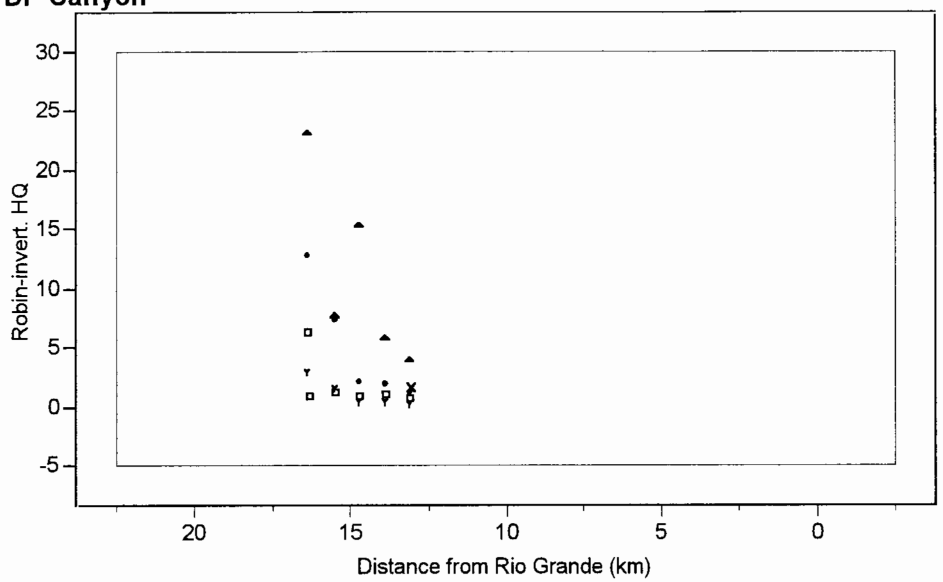
LA Canyon



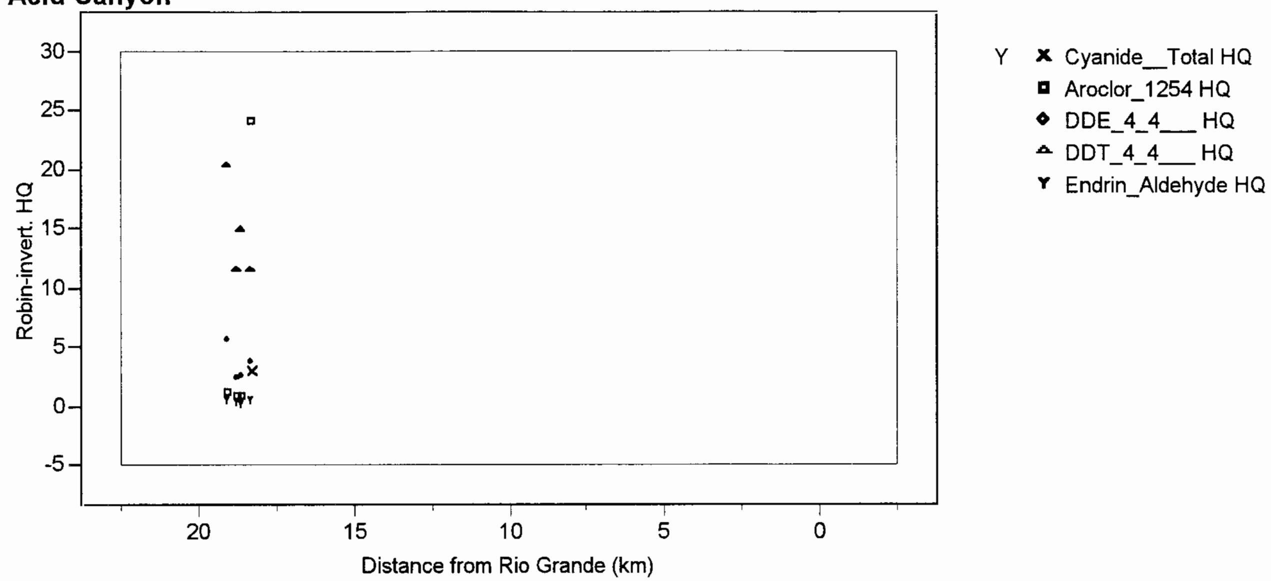
Pueblo Canyon



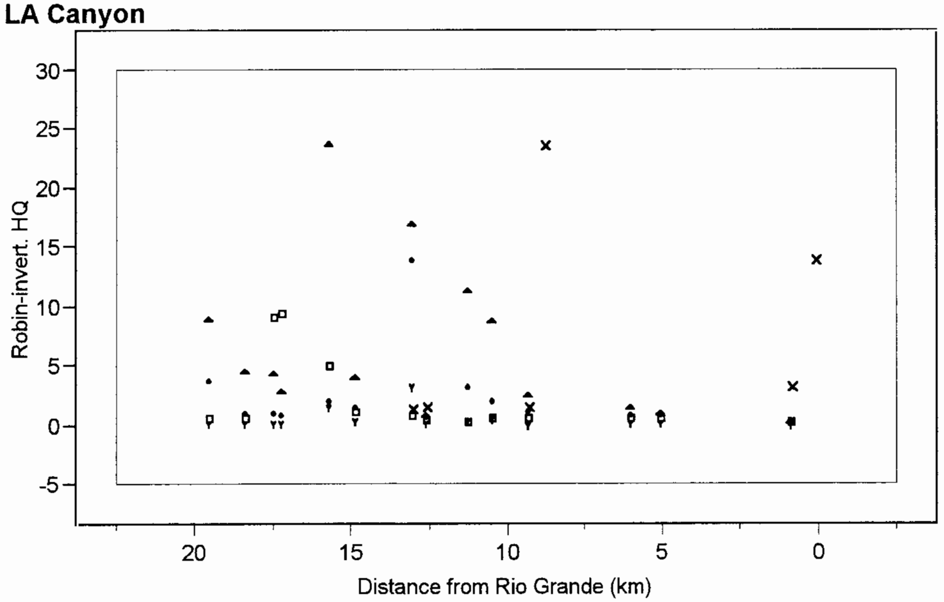
DP Canyon



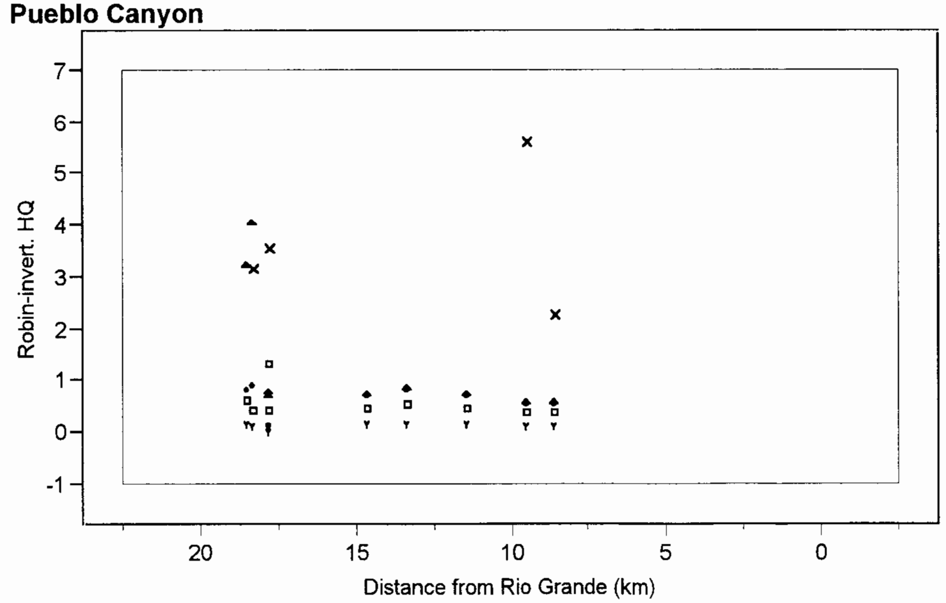
Acid Canyon

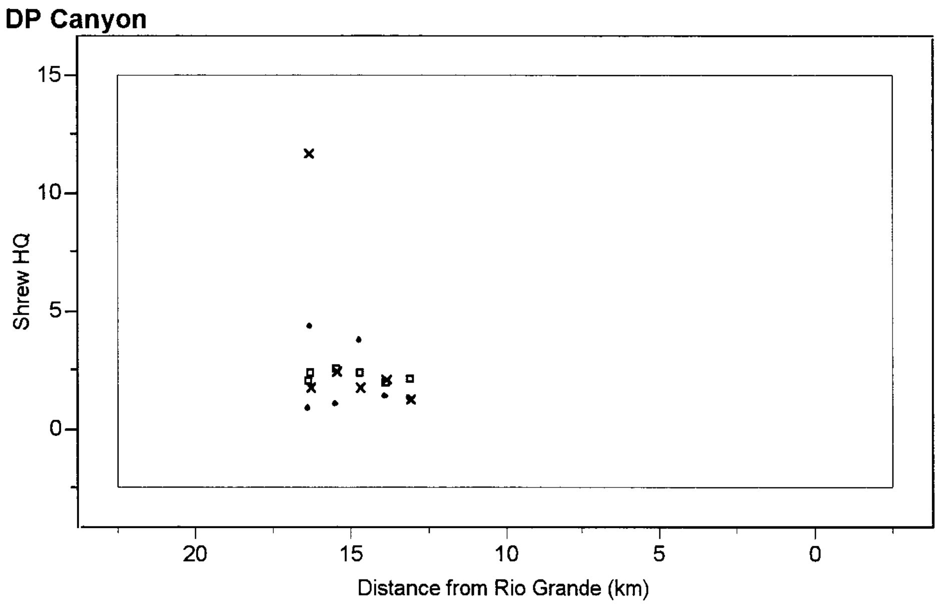


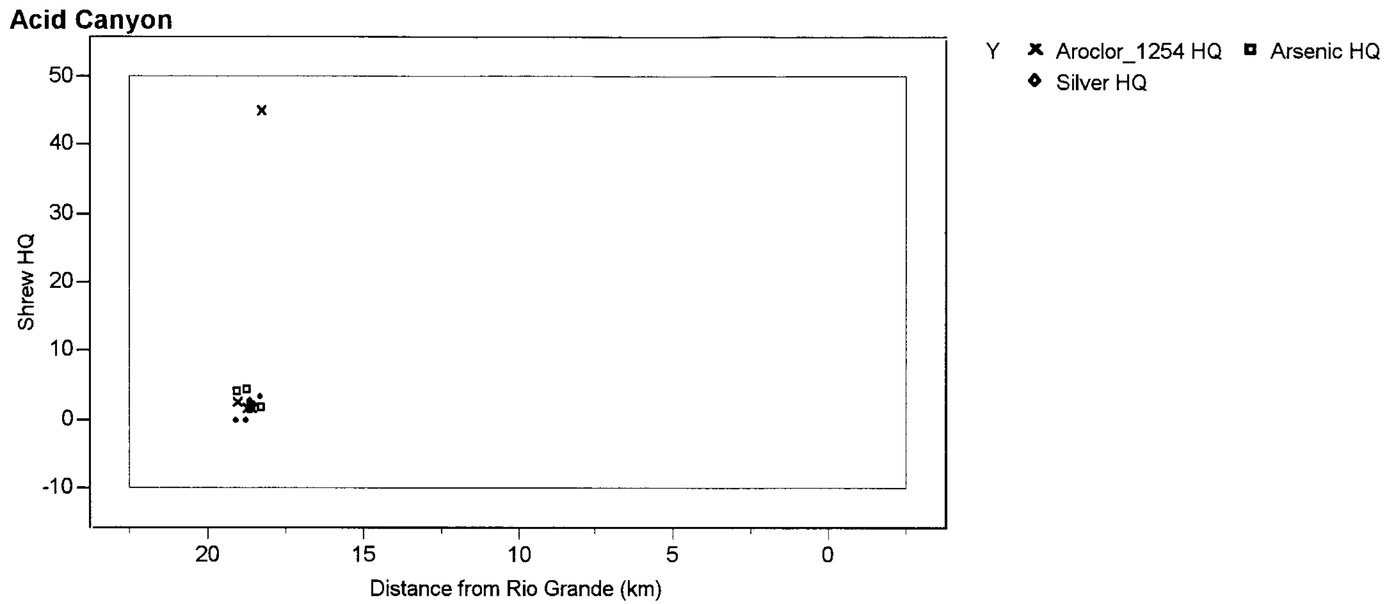
LA Canyon

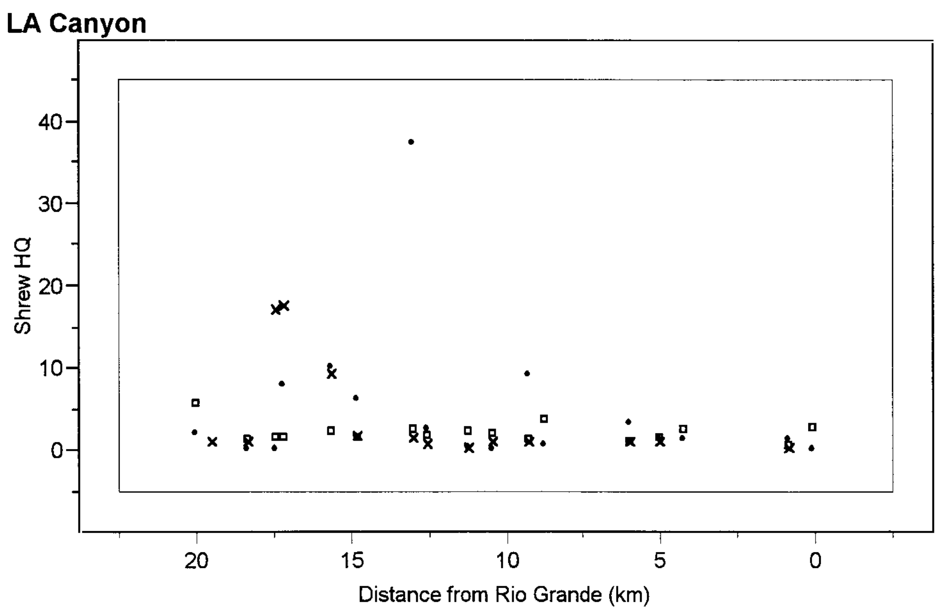


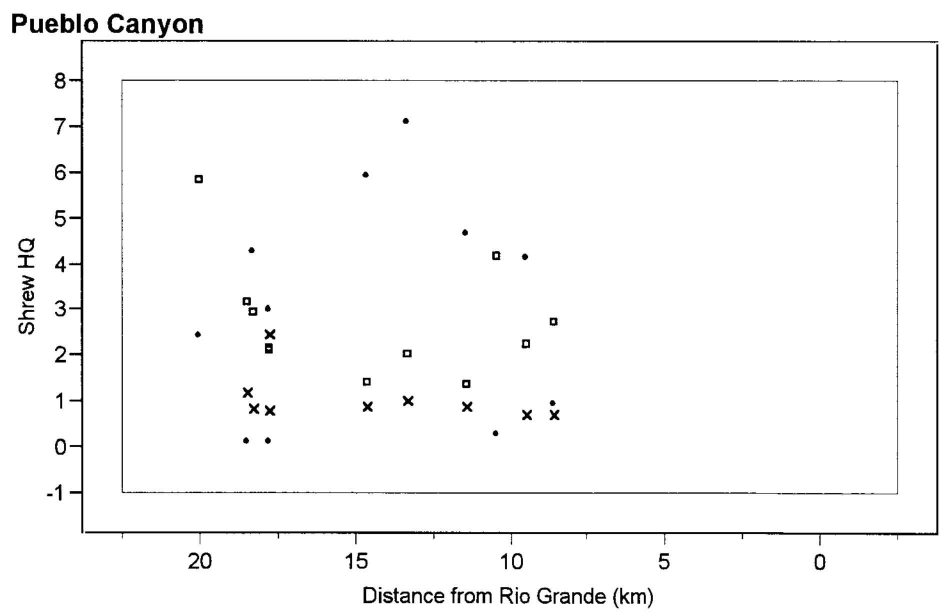
Pueblo Canyon



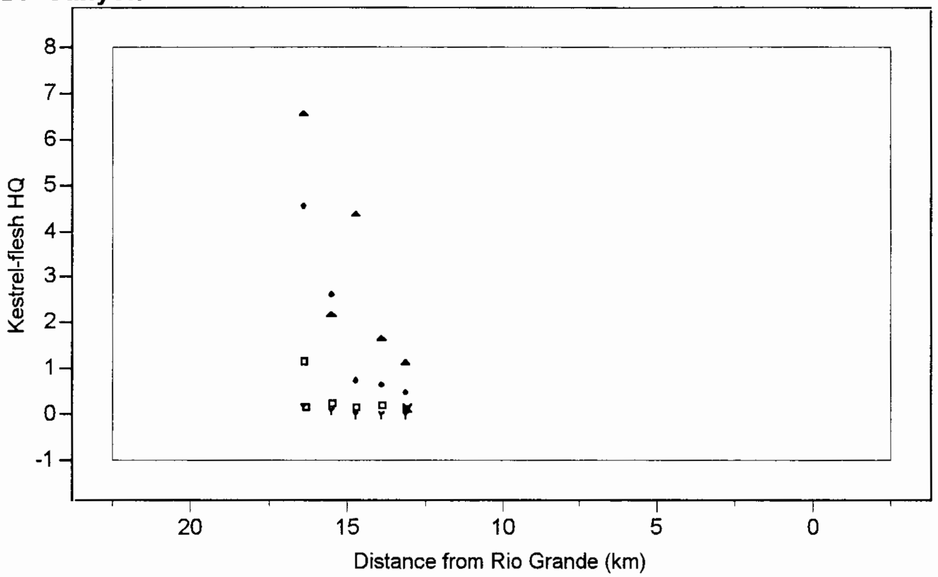

DP Canyon
Shrew HQ
15
10
5
0
20
15
10
5
0
Distance from Rio Grande (km)


Acid Canyon
Shrew HQ
50
40
30
20
10
0
-10
20
15
10
5
0
Distance from Rio Grande (km)
Y
Aroclor_1254 HQ
Arsenic HQ
Silver HQ

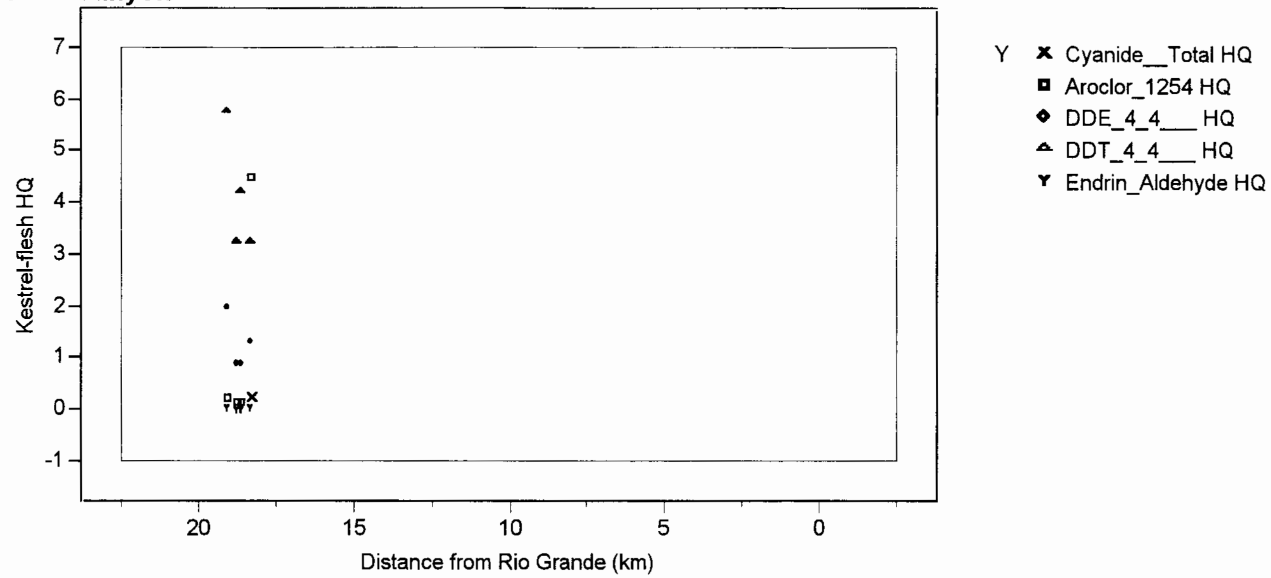

LA Canyon
Shrew HQ
40
30
20
10
0
20
15
10
5
0
Distance from Rio Grande (km)


Pueblo Canyon
Shrew HQ
8
7
6
5
4
3
2
1
0
-1
20
15
10
5
0
Distance from Rio Grande (km)

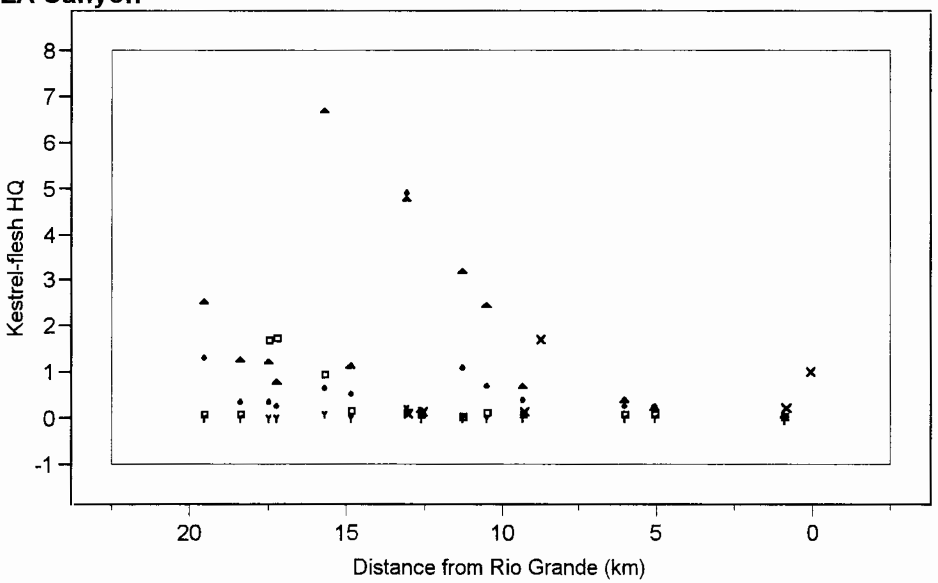
DP Canyon



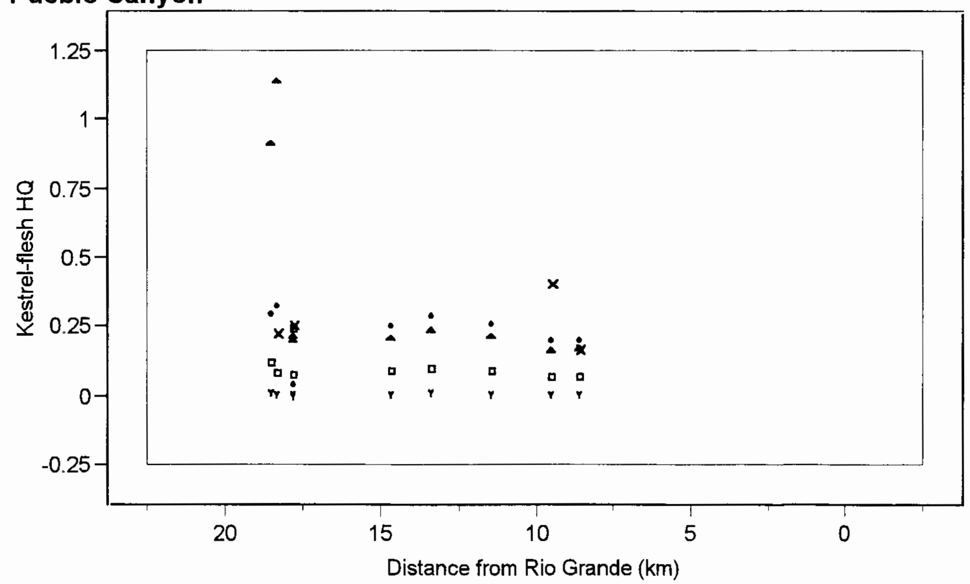
Acid Canyon



LA Canyon



Pueblo Canyon



Posted-Date: Wed, 17 Jul 2002 14:14:51 -0600 (MDT)
Date: Wed, 17 Jul 2002 14:14:16 -0600
From: kirby olson <kirby_olson@nmenv.state.nm.us>
Organization: nmed-hrmb
X-Mailer: Mozilla 4.7 [en] (Win98; U)
X-Accept-Language: en
To: John Young <john_young@nmenv.state.nm.us>,
Danny Katzman <katzman@lanl.gov>,
"'kirby_olson@nmenv.state.nm.us'" <kirby_olson@nmenv.state.nm.us>,
Randy Ryti <rryti@neptuneinc.org>, Paul Schumann <schumannp@lanl.gov>,
Ralph Ford-Schmid <Ralph_FordSchmid@nmenv.state.nm.us>,
Rich Mirenda <rmirenda@lanl.gov>,
Darlene Goering <Darlene_Goering@nmenv.state.nm.us>,
Steven Reneau <sreneau@lanl.gov>, Tom Whitacre <twhitacre@doeal.gov>,
Daniela Bowman <Daniela_Bowman@nmenv.state.nm.us>,
Alan Pratt <pratt_a@lanl.gov>
Subject: agenda for 7/18 LAPSAR meeting

The LAPSAR workgroup will meet torrow (7/18) from 2:30-4:30 PM in conference room A at the HWB offices on Rodeo Park Dr. E. Below is a draft agenda for tomorrow's meeting.

1. review results of comparison of sediment and water COPEC concentrations to screening levels

2. discuss whether the proposed measure (lab aquatic tox test) is sufficient to assess the aquatic community species diversity endpoint

3. discuss whether the studies for terrestrial assessment endpoints are adequate to cover potential risk to bat and swallow for the barium. cobalt, and cyanide COPECs

4. update on trapping catch results (if available)

5. methods for combining lines of evidence from the terrestrial studies (this item may be postponed to the next meeting depending on time restraints)

To: kirby olson <kirby_olson@nmenv.state.nm.us>
From: Randall Ryti <rryti@neptuneinc.org>
Subject: aquatic screening files
Cc:
Bcc:
Attached: M:\LAC & PC biota\Initial screening\Sediment Data Pivot Table 07-05-2002_rtr2.pdf; M:\LAC & PC biota\Initial screening\Sediment Data Pivot Table 07-05-2002_rtr.pdf; M:\LAC & PC biota\Initial screening\Water Data Pivot Table 07-06-2002_rtr.pdf; M:\LAC & PC biota\Initial screening\sed COPECs - HQ.gt.5.doc; M:\LAC & PC biota\Initial screening\water COPECs - HQ.gt.5.doc;

Kirby,

I have attached some files on the revised aquatic screening assessment for LAPSAR.

The pdf files contain the HQ analysis for the water ESLs (vs the maximum detect), sediment ESLs (vs the maximum c1 detect), and the Word documents have some plots of the water and c1 [active channel] sediment deposits.

Here are some observations on the screening:

1) Water Data Pivot Table 07-06-2002_rtr.pdf
a) This table shows that the wildlife receptors have low HQ values for maximum detected concentrations of analytes in alluvial groundwater and surface water. Thus, in a multimedia assessment the drinking water pathway would only add a negligible amount to the dose from soil-related pathways to wildlife. The only exception is that the maximum water concentration for aluminum is about 5x the wildlife drinking water ESL. However, the maximum aluminum concentration is one of a few high values [>1000 ug/L] and is does not appear that a chronic aluminum water concentration is anywhere close to the water ESL.
b) This table also shows that the HQ for the final water ESL [which is always for the aquatic community] is greater than 1 for 25 COPECs and the HQ is greater than 5 for 12 COPECs. Only the less reliable gamma scan [GS] results for U-238 are greater than 5, and it is not included in the list of 12 COPECs with HQ>5. The 12 COPECs include 9 metals and 3 PAHs. The PAHs were only detected 2 times out of 88 samples. Thus, adverse effects on the aquatic community are possible based on the ESL comparison to the maximum.
c) There are no published water background data for LANL. Thus, some of the metals concentrations may be background levels and not represent anthropogenic contaminant sources. This may or may not be an issue for the LAPSAR. One way around this problem is to utilize the Canon de Valle toxicity testing results [Chironomus tentans] to determine more site-specific water ESLs for the aquatic community. Hopefully these site-specific ESLs would incorporate the ambient levels of metals.

2) water COPECs - HQ.gt.5.doc
a) This file has some data plots of the 12 COPECs with HQs>5. The plots have reference lines for the ESLs [as noted in the footer]. Negative values are non-detects plotted at the detection limit [inorganics and organics only].
b) Media_code: WGA = alluvial groundwater, WGS=spring, WS=surface water, WT=stormwater [excluded from plots]

c) Ordered segment refers to hydrologic segment: upper LA=down to DP Canyon confluence; middle LA=DP Canyon and LA Canyon to Pueblo confluence; lower LA=LA Canyon downstream of Pueblo; upper Pueblo=Pueblo above Acid Canyon confluence; middle Pueblo=Acid Canyon and Pueblo Canyon down to Bayo WWTP outfall; lower Pueblo=downstream of Bayo WWTP outfall
d) data include CY2000 [after CGF] and CY2001 samples
e) There appears to be a misreported beryllium concentration [off by a factor of 1000 from other values]
f) There are elevated detection limits for PAHs in most sampling rounds. The last sampling round in CY2001 has adequate detection limits and no detected sample results.

3) Sediment Data Pivot Table 07-05-2002_rtr.pdf
a) This table contains the HQ summary for maximum detected concentration in the active channel [or c1 geomorphic unit]. HQs are presented for bat, swallow, and aquatic community.
b) Only three COPECs have HQs>5 for the bat and swallow - barium, cobalt, and cyanide. These are inorganics that are addressed in the terrestrial invertevore assessment endpoint and associated measures. Thus, it may not be necessary to evaluate the aerial insectivore feeding guild. Another consideration is relative rarity of aquatic environments that could produce emergent insects compared to the breadth of terrestrial habitat in the watershed.
c) PAHs and radionuclides tend to be the most notable COPECs for the aquatic community.

4) sed COPECs - HQ.gt.5.doc
a) This file has some data plots of the 13 COPECs with HQs>5. The plots have reference lines for the ESLs [as noted in the footer]. Negative values are non-detects plotted at the detection limit [inorganics and organics only].
b) Elevated detection limits for organics are an issue.
c) IsoU should be dropped as COPECs becuase all isoU concentrations are less than the BV.

5) Sediment Data Pivot Table 07-05-2002_rtr2.pdf
a) This table contains the HQ analysis for the c1 maximum detect for the terrestrial receptors. This is presented because many c1 units are terrestrial habitat [recall the dry reaches from the tour]. The c1 data were included in the terrestrial screen but this is presented so that you can see the HQs for the c1 data only. The HQ values for the c1 maxima are less than the HQs values for the overall sediment data set. The primary risk drivers for wildlife are barium, cobalt, and cyanide, which are COPECs considered in the terrestrial sampling design.

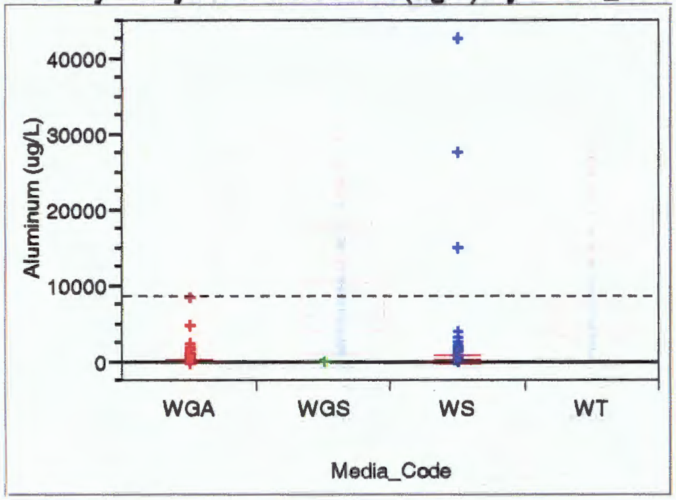
Please review these materials and let me know if you are available on Wednesday morning [7/17/02] to talk about them. We also need an agenda for the 7/18/02 meeting. Perhaps we can include the following items:
a) Aquatic screening results - review the attached set of information [?]
b) Discuss the proposed endpoint [aquatic community species diversity] and measure [lab tox test]. Do we need other measures?
c) Methods for combining lines of evidence across terrestrial measures. I think that a qualitative score for measures of effects would be useful for risk characterization. We could look at the information that I previously prepared as one basis for scoring a measure of effect as low, medium, high.

Randy

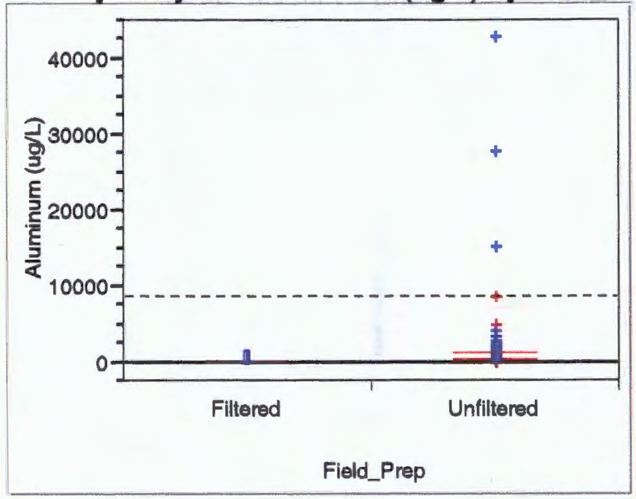
Group	Analyte	Units	max	count	detects	detect freq	final ESL	aq comm ESL	wildlife ESL	>final ESL	HQ	>wildlife ESL	w_HQ	HQ >5?
inorg	Aluminum	ug/L	42800	337	138	0.41	87	87	8600	>ESL	491.95	>w_ESL	4.98	yes
inorg	Antimony	ug/L	4.1	337	15	0.04	100	100	560		0.04		0.01	
inorg	Arsenic	ug/L	11	337	166	0.49	150	150	560		0.07		0.02	
inorg	Barium	ug/L	467	337	337	1.00	3.8	3.8	2400	>ESL	122.89		0.19	yes
inorg	Beryllium	ug/L	540	337	80	0.24	5.3	5.3	2900	>ESL	101.89		0.19	yes
inorg	Boron	ug/L	396	91	57	0.63	540	540	120000		0.73		0.00	
inorg	Bromide	ug/L	1480	40	16	0.40	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Cadmium	ug/L	0.83	337	15	0.04	0.15	0.15	4400	>ESL	5.53		0.00	yes
inorg	Calcium	ug/L	110000	331	331	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Chloride	ug/L	270000	182	182	1.00	230000	230000	n/a	>ESL	1.17	n/a	n/a	
inorg	Chromium	ug/L	18.8	69	30	0.43	77	77	100000		0.24		0.00	
inorg	Chromium__total_	ug/L	35	268	133	0.50	77	77	100000		0.45		0.00	
inorg	Cobalt	ug/L	11	337	147	0.44	3	3	82	>ESL	3.67		0.13	
inorg	Copper	ug/L	146	337	184	0.55	5	5	52000	>ESL	29.20		0.00	yes
inorg	Cyanide__Total	ug/L	25	87	8	0.09	5.2	5.2	160	>ESL	4.81		0.16	
inorg	Cyanide_Amenable_to_chlorination	ug/L	29.1	24	1	0.04	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Fluoride	ug/L	1600	109	95	0.87	1600	1600	50000		1.00		0.03	
inorg	Iron	ug/L	24200	337	162	0.48	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Lead	ug/L	43.5	337	71	0.21	1.2	1.2	22000	>ESL	36.25		0.00	yes
inorg	Magnesium	ug/L	12300	332	332	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Manganese	ug/L	6200	337	279	0.83	80	80	190000	>ESL	77.50		0.03	yes
inorg	Mercury	ug/L	0.12	341	11	0.03	1.3	1.3	1800		0.09		0.00	
inorg	Molybdenum	ug/L	586	162	62	0.38	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Nickel	ug/L	48.1	337	194	0.58	28	28	170000	>ESL	1.72		0.00	
inorg	Phosphorus	ug/L	7400	77	45	0.58	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Potassium	ug/L	17000	331	331	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Selenium	ug/L	5.1	340	71	0.21	2	2	890	>ESL	2.55		0.01	
inorg	Silver	ug/L	2.9	337	46	0.14	0.36	0.36	89	>ESL	8.06		0.03	yes
inorg	Sodium	ug/L	160000	331	331	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	SR	ug/L	283	18	18	1.00	620	620	110000		0.46		0.00	
inorg	Thallium	ug/L	4.4	337	59	0.18	18	18	310		0.24		0.01	
inorg	Total_Uranium_by_ICPMS	ug/L	3.3	37	34	0.92	1.8	1.8	27000	>ESL	1.83		0.00	
inorg	Uranium	ug/L	6.34	54	47	0.87	1.8	1.8	27000	>ESL	3.52		0.00	
inorg	Vanadium	ug/L	30.7	337	300	0.89	19	19	4500	>ESL	1.62		0.01	
inorg	Zinc	ug/L	940	337	160	0.47	66	66	490000	>ESL	14.24		0.00	yes
org	Acenaphthene	ug/L	0.63	88	2	0.02	23	23	310000		0.03		0.00	
org	Acenaphthylene	ug/L	0.63	88	2	0.02	30	30	310000		0.02		0.00	
org	Acetone	ug/L	28	62	14	0.23	11000	11000	44000		0.00		0.00	
org	Anthracene	ug/L	0.61	88	2	0.02	0.0013	0.0013	440000	>ESL	469.23		0.00	yes
org	Benzene	ug/L	0.45	73	1	0.01	45	45	110000		0.01		0.00	
org	Benzo_a_anthracene	ug/L	0.79	88	2	0.02	0.027	0.027	760	>ESL	29.26		0.00	yes
org	Benzo_a_pyrene	ug/L	0.63	88	2	0.02	0.014	0.014	4400	>ESL	45.00		0.00	yes
org	Benzo_b_fluoranthene	ug/L	0.58	88	2	0.02	30	30	17000		0.02		0.00	
org	Benzo_g_h_i_perylene	ug/L	0.58	88	2	0.02	30	30	32000		0.02		0.00	
org	Benzo_k_fluoranthene	ug/L	0.77	88	2	0.02	30	30	32000		0.03		0.00	
org	Benzoic_Acid	ug/L	24.8	88	1	0.01	41	41	17000		0.60		0.00	
org	BHC_beta__	ug/L	0.1	79	1	0.01	2.4	2.4	1700		0.04		0.00	
org	BHC_gamma__	ug/L	0.0057	79	1	0.01	0.08	0.08	62		0.07		0.00	
org	Bis_2_ethylhexyl_phthalate	ug/L	6.8	89	16	0.18	32	32	4500		0.21		0.00	
org	Chloroform	ug/L	0.24	73	2	0.03	180	180	67000		0.00		0.00	
org	Chloronaphthalene_2__	ug/L	0.6	89	2	0.02	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
org	Chrysene	ug/L	0.69	88	2	0.02	30	30	760		0.02		0.00	
org	DDD_4_4___	ug/L	0.0088	79	2	0.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
org	DDE_4_4___	ug/L	0.0073	79	1	0.01	10	10	29		0.00		0.00	
org	DDT_4_4___	ug/L	0.098	79	15	0.19	0.04	0.04	29	>ESL	2.45		0.00	
org	Di_n_butylphthalate	ug/L	2.3	89	1	0.01	32	32	570		0.07		0.00	
org	Dibenz_a_h_anthracene	ug/L	0.43	88	1	0.01	30	30	5900		0.01		0.00	
org	Dichlorobenzene_1_4___VOC	ug/L	0.17	73	1	0.01	15	15	1100000		0.01		0.00	
org	Dieldrin	ug/L	0.0054	79	1	0.01	0.056	0.056	89		0.10		0.00	
org	Diethylphthalate	ug/L	5.5	89	2	0.02	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
org	Ethylbenzene	ug/L	0.19	73	1	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
org	Fluoranthene	ug/L	0.63	88	2	0.02	6.1	6.1	56000		0.10		0.00	
org	Fluorene	ug/L	1.5	88	3	0.03	3.9	3.9	560000		0.38		0.00	
org	Heptachlorodibenzodioxins_Total	ug/L	5.15E-05	5	1	0.20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
org	Heptachlorodibenzofuran1234678	ug/L	8.97E-06	5	1	0.20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
org	Heptachlorodibenzofurans__Total_	ug/L	1.85E-05	5	1	0.20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
org	Hexachlorodibenzofurans__Total_	ug/L	5.16E-06	5	1	0.20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
org	Indeno_1_2_3_cd_pyrene	ug/L	0.57	88	2	0.02	30	30	32000		0.02		0.00	
org	Isopropyltoluene_4__	ug/L	0.21	62	1	0.02	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
org	Methylene_Chloride	ug/L	40	73	23	0.32	2200	2200	26000		0.02		0.00	
org	Methylnaphthalene_2__	ug/L	0.58	89	2	0.02	2	2	10000		0.29		0.00	
org	Naphthalene_SVOC	ug/L	0.56	88	2	0.02	23	23	570		0.02		0.00	
org	Octachlorodibenzodioxin12346789	ug/L	0.000217	5	1	0.20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
org	Phenanthrene	ug/L	0.68	88	2	0.02	6.3	6.3	23000		0.11		0.00	
org	Phenol	ug/L	3	87	1	0.01	110	110	260000		0.03		0.00	

Group	Analyte	Units	max	count	detects	detect freq	final ESL	aq comm ESL	wildlife ESL	>final ESL	HQ	>wildlife ESL	w_HQ	HQ >5?
org	Pyrene	ug/L	0.68	88	2	0.02	30	30	33000		0.02		0.00	
org	Toluene	ug/L	1.2	73	10	0.14	130	130	110000		0.01		0.00	
org	Trimethylbenzene_1_2_4_	ug/L	0.3	62	1	0.02	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
org	Xylene__Total_	ug/L	1	62	1	0.02	86	86	3200		0.01		0.00	
org	Xylene_1_2_	ug/L	0.32	62	1	0.02	86	86	3200		0.00		0.00	
org	Xylene_1_3__Xylene_1_4_	ug/L	0.72	19	1	0.05	86	86	3200		0.01		0.00	
other	Alkalinity__total_	ug/L	294000	90	90	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Alkalinity_methyl_orange_total	ug/L	260000	41	41	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Ammonia	ug/L	15000	30	11	0.37	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Ammonia__as_N_	ug/L	20000	78	25	0.32	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Ammonium	ug/L	1110	2	2	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Ammonium__as_N_	ug/L	930	2	2	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Bicarbonate	ug/L	188000	13	13	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Bicarbonate__as_CaCO3_	ug/L	240000	46	46	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Carbonate__as_CaCO3_	ug/L	24000	46	1	0.02	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Conductivity	us/cm2	899	23	23	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Diesel_Range_Organics	ug/L	2.2	10	2	0.20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Dissolved_Organic_Carbon	ug/L	77000	147	146	0.99	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Dissolved_Organic_Carbon_HS	ug/L	9200	17	17	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	HARDNESS	ug/L	183000	11	11	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	HSHydrophilic__Acids	ug/L	3700	20	20	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	HSHydrophilic__Bases	ug/L	600	20	17	0.85	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	HSHydrophilic__Neutrals	ug/L	300	20	13	0.65	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	HSHydrophilic__Total	ug/L	4600	21	21	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	HSHydrophobic__Acids	ug/L	3600	21	21	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	HSHydrophobic__Bases	ug/L	100	21	1	0.05	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	HSHydrophobic__Neutrals	ug/L	1800	21	21	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	HSHydrophobic__Total	ug/L	4800	21	21	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Nitrate_Nitrite__as_N_	ug/L	30000	77	69	0.90	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Perchlorate	ug/L	1300	166	33	0.20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	pH	su	7	4	4	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	pH_HS	su	8.01	25	25	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	SIO2	ug/L	74900	12	12	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Solids__Total_Dissolved	ug/L	632000	22	22	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Solids__Total_Suspended	ug/L	1.2E+08	21	17	0.81	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Sulfate	ug/L	250000	176	171	0.97	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Total_Kjeldahl_Nitrogen__as_N_	ug/L	300	1	1	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
other	Total_Organic_Carbon	ug/L	94000	138	127	0.92	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
rad	Americium_241	pCi/L	1.43	210	193		5.8	5.8	5700000		0.25		0.00	
rad	Americium_241_GS	pCi/L	10.6	46	15		5.8	5.8	5700000	>ESL	1.83		0.00	
rad	Cesium_134	pCi/L	14.2	213	64		470	470	7500000		0.03		0.00	
rad	Cesium_137	pCi/L	44	213	107		1100	1100	16000000		0.04		0.00	
rad	Plutonium_238	pCi/L	0.7	281	167		19	19	2800000		0.04		0.00	
rad	Plutonium_239	pCi/L	57.4	280	232		20	20	2900000	>ESL	2.87		0.00	
rad	Strontium_90	pCi/L	150	320	285		570	570	3800000		0.26		0.00	
rad	Technetium_99	pCi/L	37.9	81	40		n/a	n/a	n/a	n/a	n/a	n/a	n/a	
rad	Tritium	pCi/L	549.196	100	72		1.6E+08	1.6E+08	6.8E+10		0.00		0.00	
rad	Uranium_234	pCi/L	7.6	205	203		22	22	14000000		0.35		0.00	
rad	Uranium_235	pCi/L	5.14	210	181		24	24	15000000		0.21		0.00	
rad	Uranium_235_GS	pCi/L	51	46	36		24	24	15000000	>ESL	2.13		0.00	
rad	Uranium_238	pCi/L	3.8	205	204		24	24	15000000		0.16		0.00	
rad	Uranium_238_GS	pCi/L	183	22	15		24	24	15000000	>ESL	7.63		0.00	

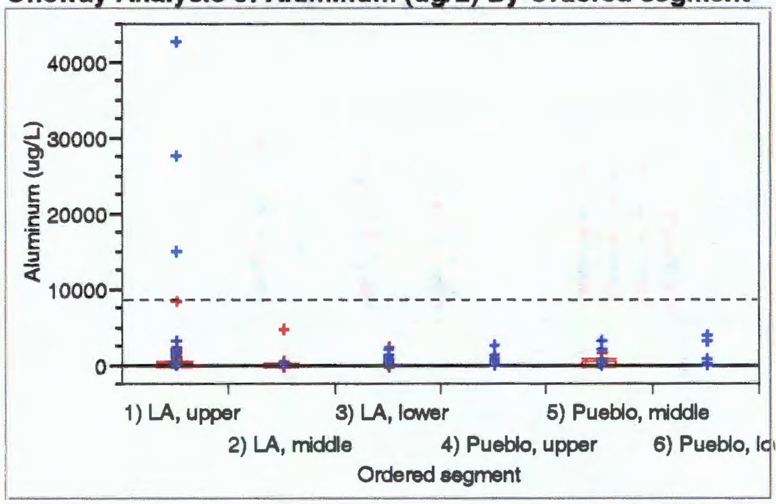
Oneway Analysis of Aluminum (ug/L) By Media_Code



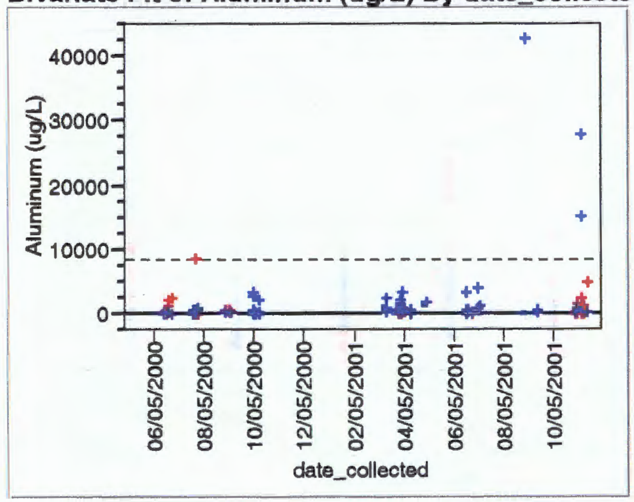
Oneway Analysis of Aluminum (ug/L) By Field_Prep



Oneway Analysis of Aluminum (ug/L) By Ordered segment

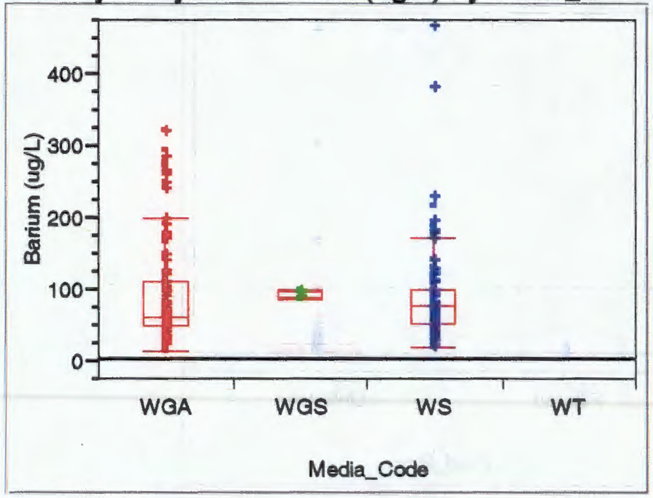


Bivariate Fit of Aluminum (ug/L) By date_collected

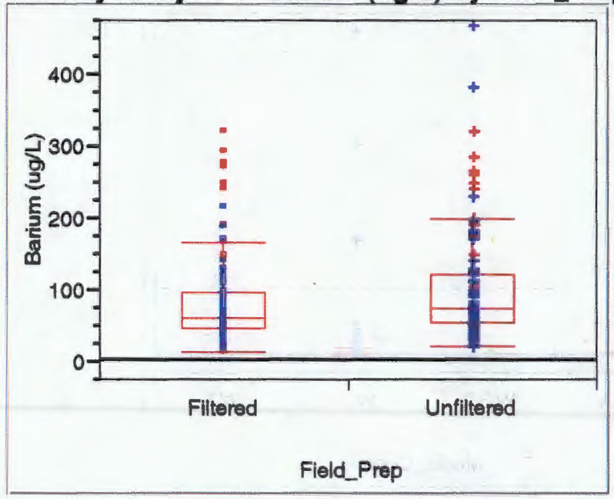


Dashed line – wildlife water ESL; Solid line – aquatic community ESL

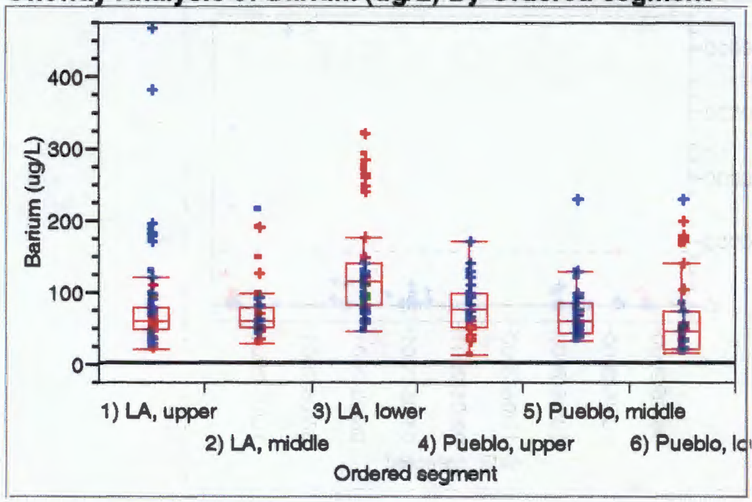
Oneway Analysis of Barium (ug/L) By Media_Code



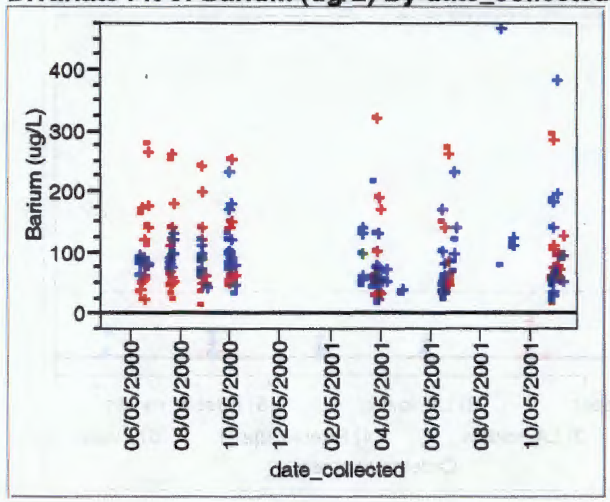
Oneway Analysis of Barium (ug/L) By Field_Prep



Oneway Analysis of Barium (ug/L) By Ordered segment

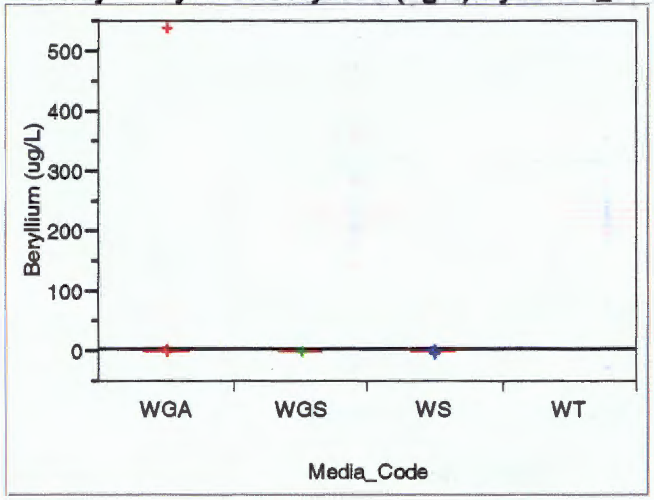


Bivariate Fit of Barium (ug/L) By date_collected

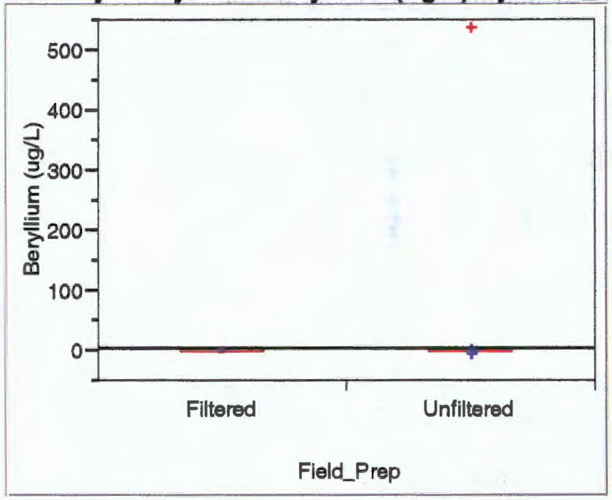


Dashed line – wildlife water ESL; Solid line – aquatic community ESL

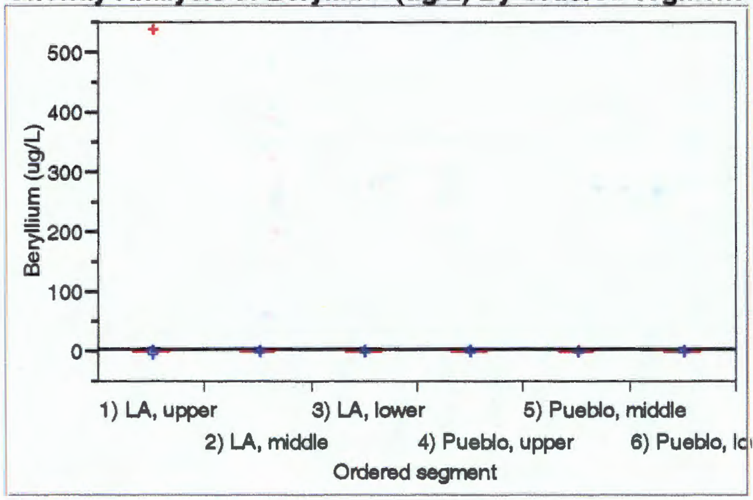
Oneway Analysis of Beryllium (ug/L) By Media_Code



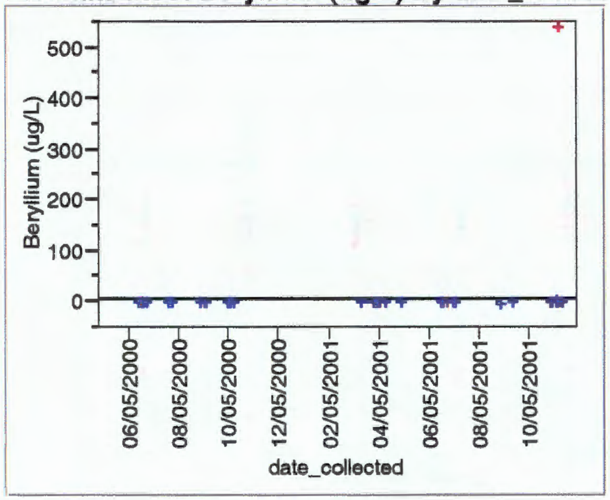
Oneway Analysis of Beryllium (ug/L) By Field_Prep



Oneway Analysis of Beryllium (ug/L) By Ordered segment

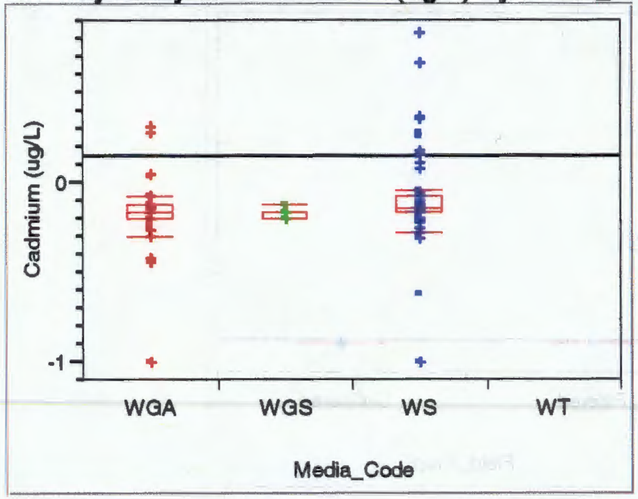


Bivariate Fit of Beryllium (ug/L) By date_collected

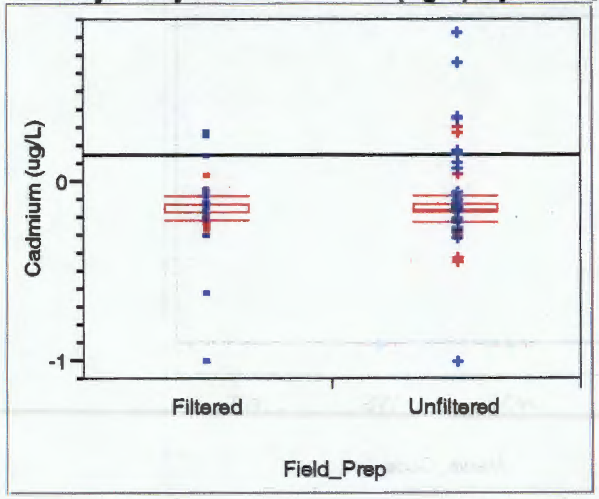


Dashed line – wildlife water ESL; Solid line – aquatic community ESL

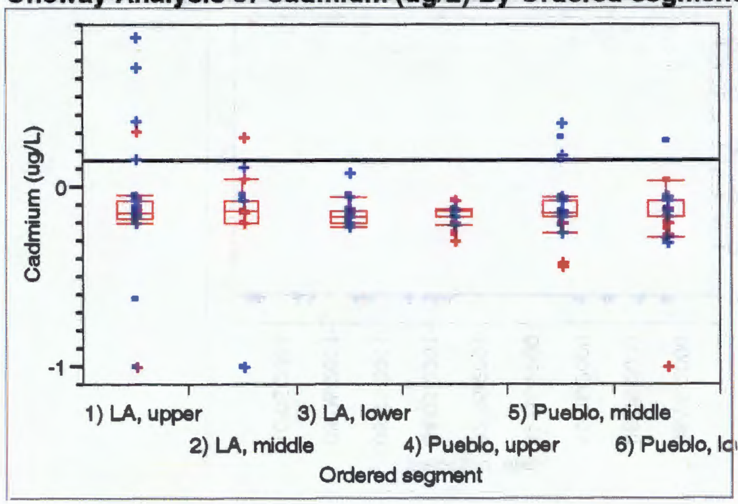
Oneway Analysis of Cadmium (ug/L) By Media_Code



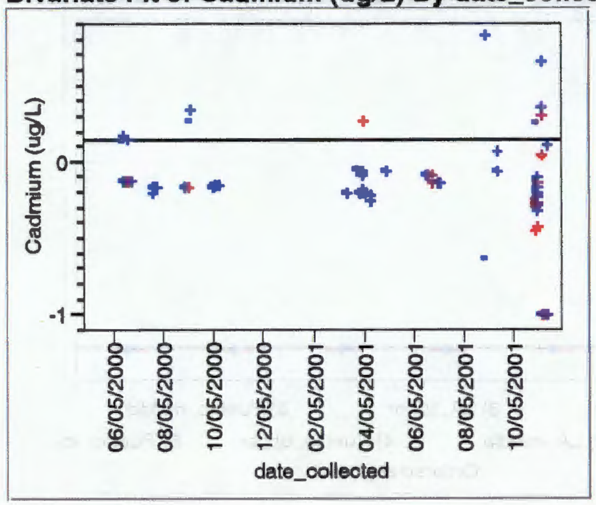
Oneway Analysis of Cadmium (ug/L) By Field_Prep



Oneway Analysis of Cadmium (ug/L) By Ordered segment

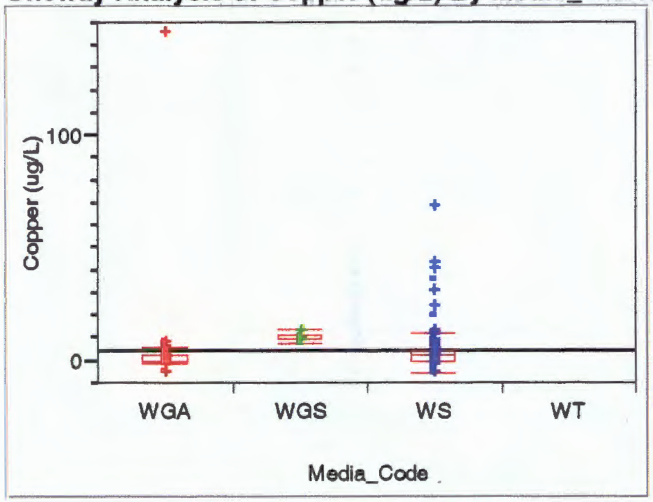


Bivariate Fit of Cadmium (ug/L) By date_collected

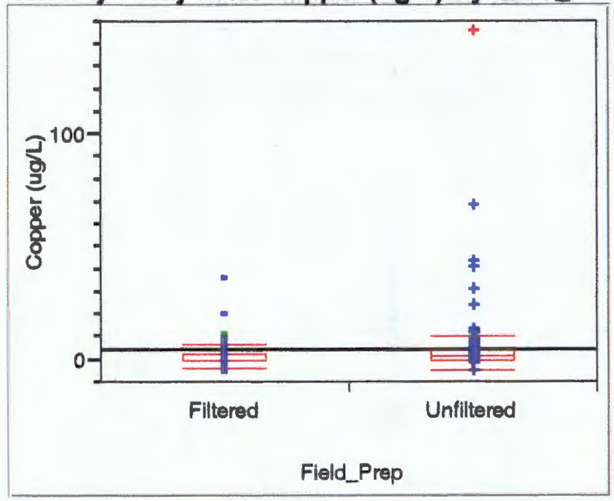


Dashed line – wildlife water ESL; Solid line – aquatic community ESL

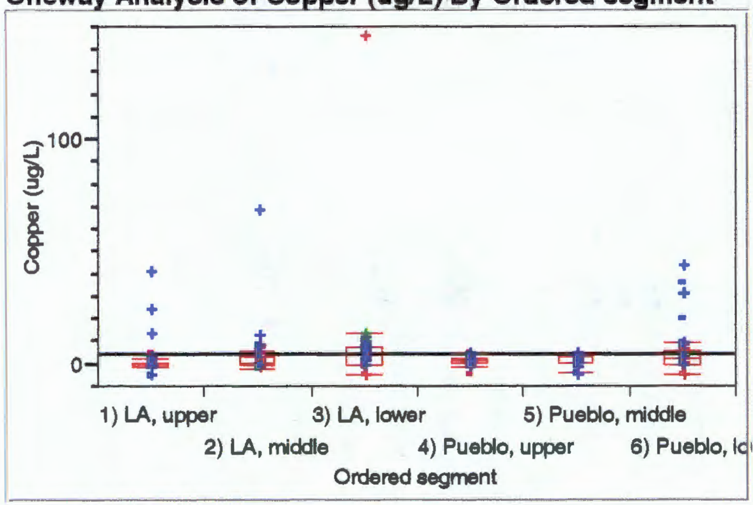
Oneway Analysis of Copper (ug/L) By Media_Code



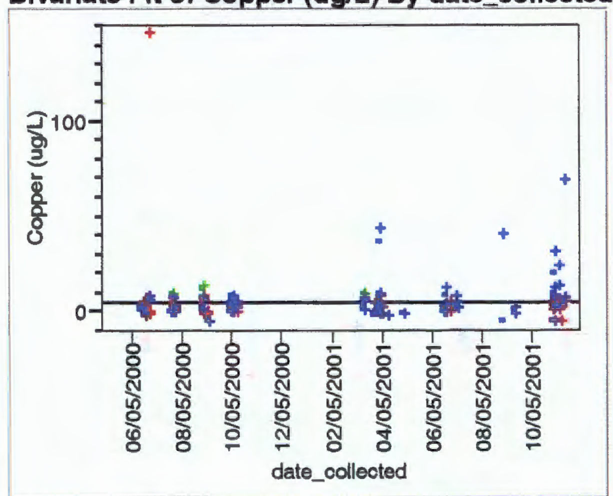
Oneway Analysis of Copper (ug/L) By Field_Prep



Oneway Analysis of Copper (ug/L) By Ordered segment

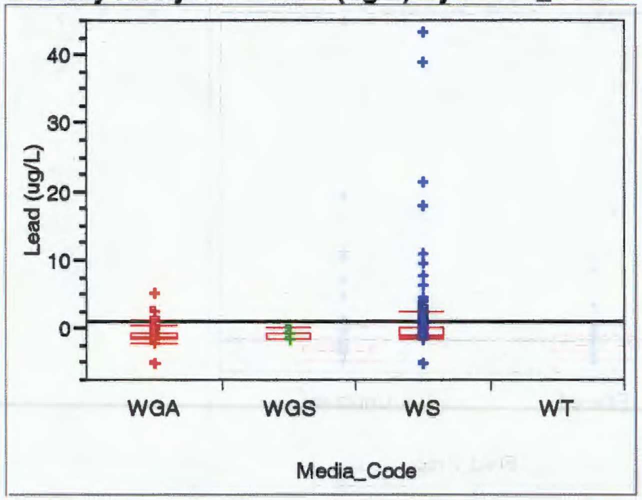


Bivariate Fit of Copper (ug/L) By date_collected

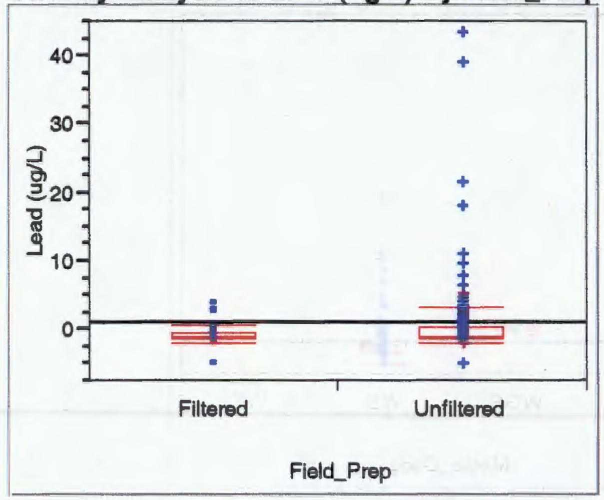


Dashed line – wildlife water ESL; Solid line – aquatic community ESL

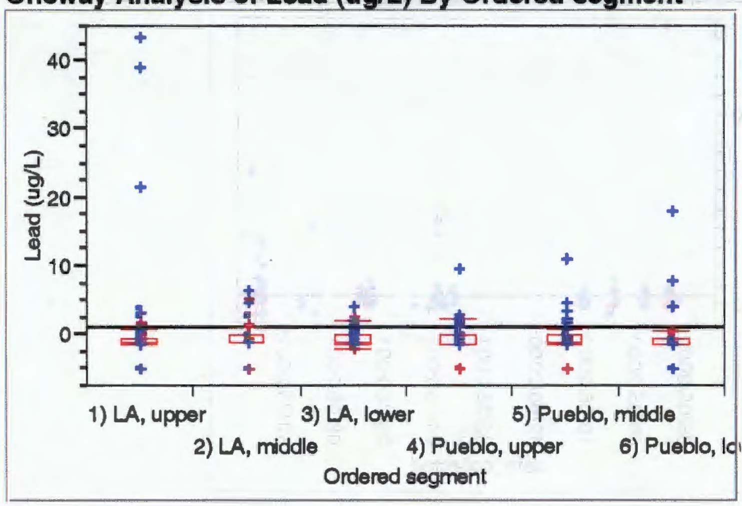
Oneway Analysis of Lead (ug/L) By Media_Code



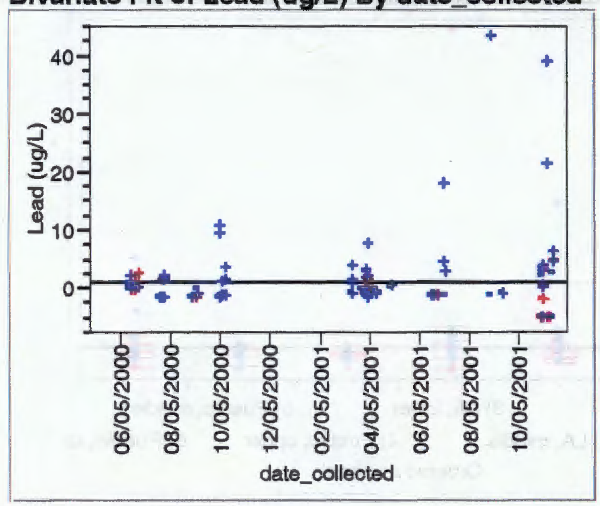
Oneway Analysis of Lead (ug/L) By Field_Prep



Oneway Analysis of Lead (ug/L) By Ordered segment

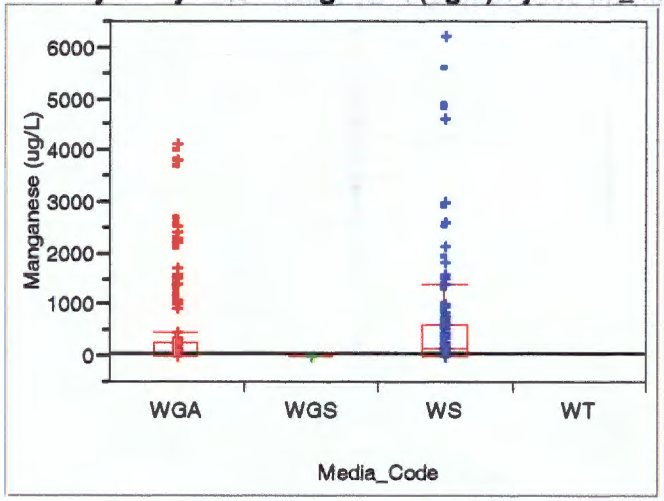


Bivariate Fit of Lead (ug/L) By date_collected

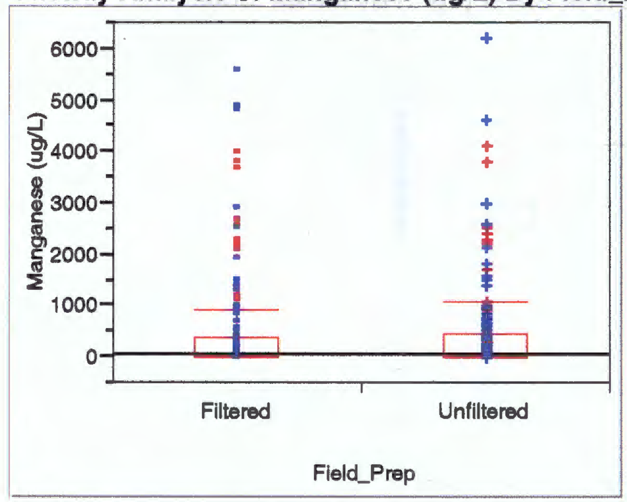


Dashed line – wildlife water ESL; Solid line – aquatic community ESL

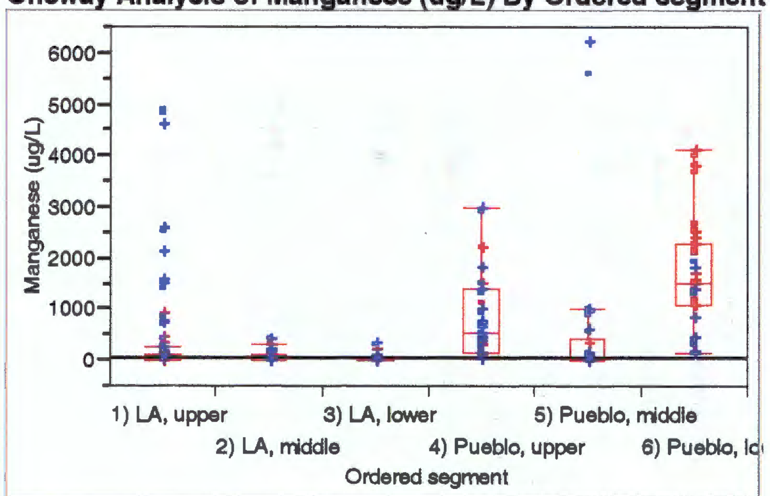
Oneway Analysis of Manganese (ug/L) By Media_Code



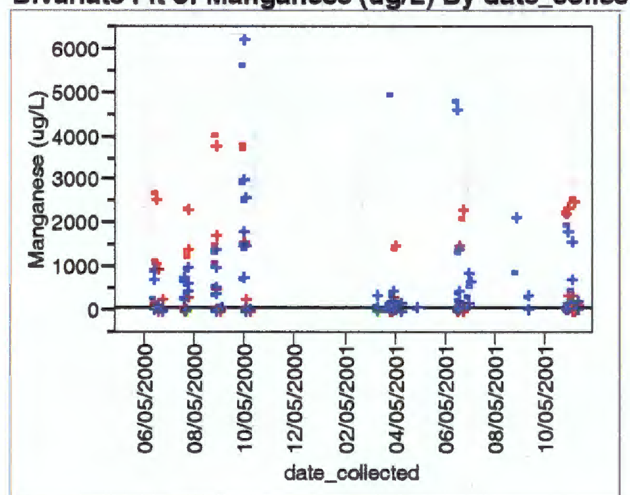
Oneway Analysis of Manganese (ug/L) By Field_Prep



Oneway Analysis of Manganese (ug/L) By Ordered segment

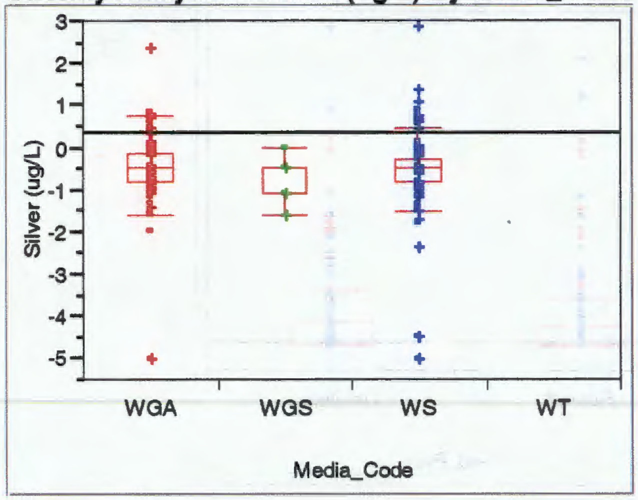


Bivariate Fit of Manganese (ug/L) By date_collected

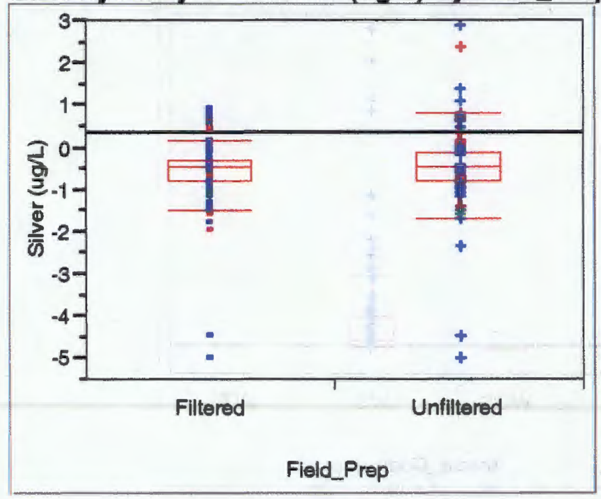


Dashed line – wildlife water ESL; Solid line – aquatic community ESL

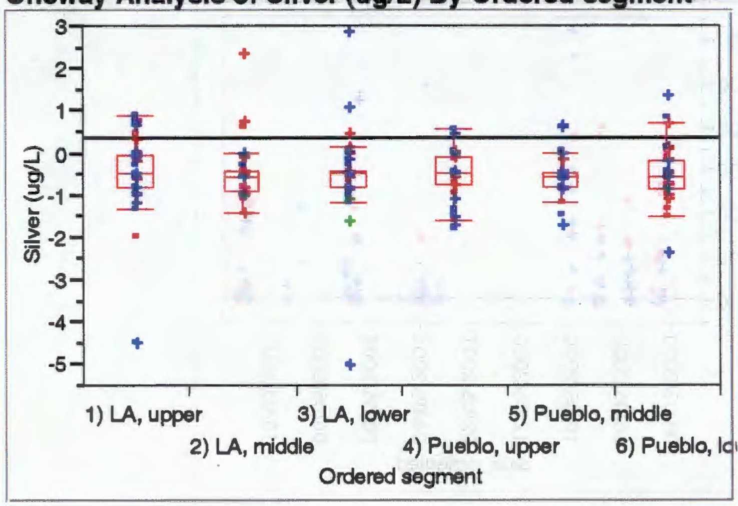
Oneway Analysis of Silver (ug/L) By Media_Code



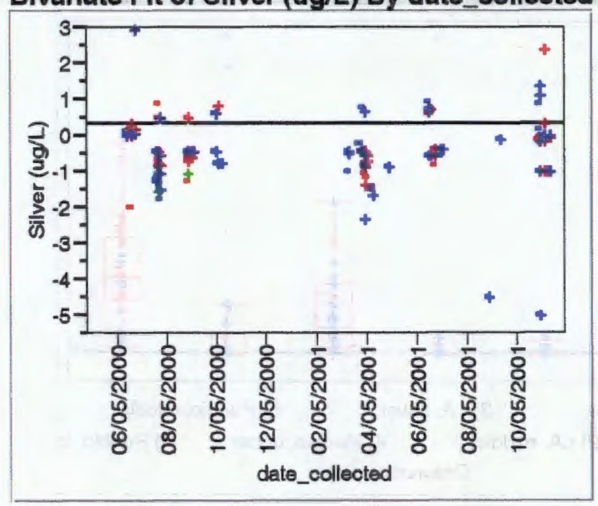
Oneway Analysis of Silver (ug/L) By Field_Prep



Oneway Analysis of Silver (ug/L) By Ordered segment

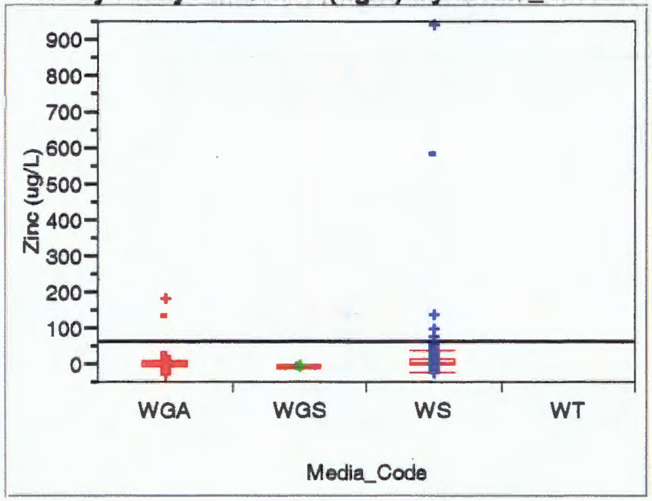


Bivariate Fit of Silver (ug/L) By date_collected

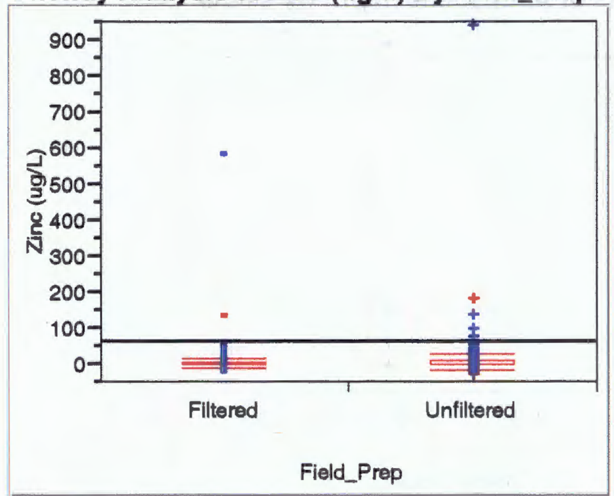


Dashed line – wildlife water ESL; Solid line – aquatic community ESL

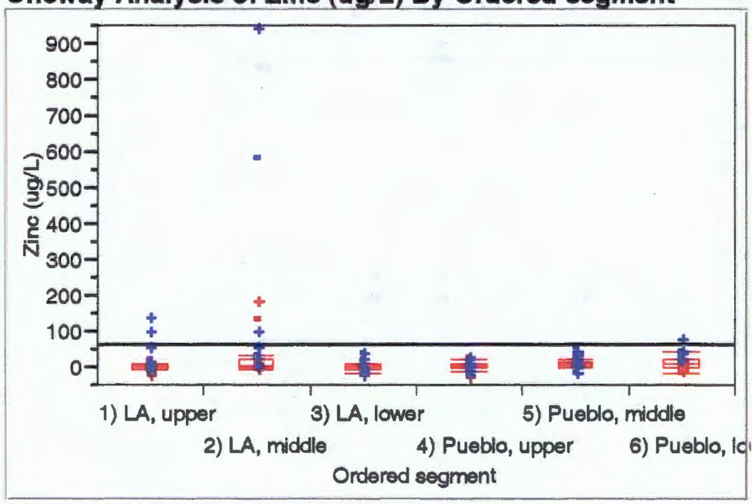
Oneway Analysis of Zinc (ug/L) By Media_Code



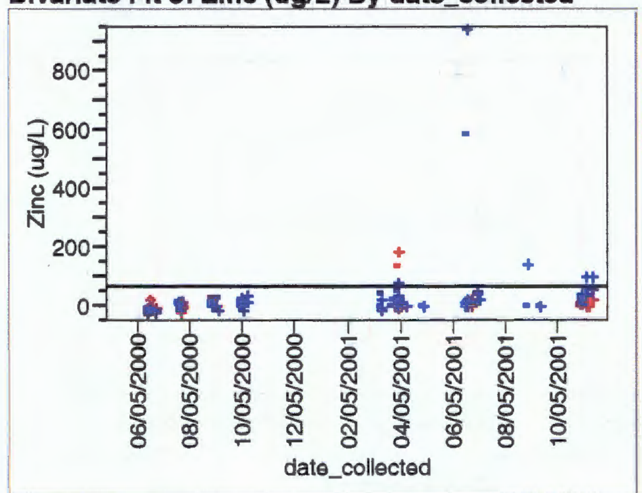
Oneway Analysis of Zinc (ug/L) By Field_Prep



Oneway Analysis of Zinc (ug/L) By Ordered segment

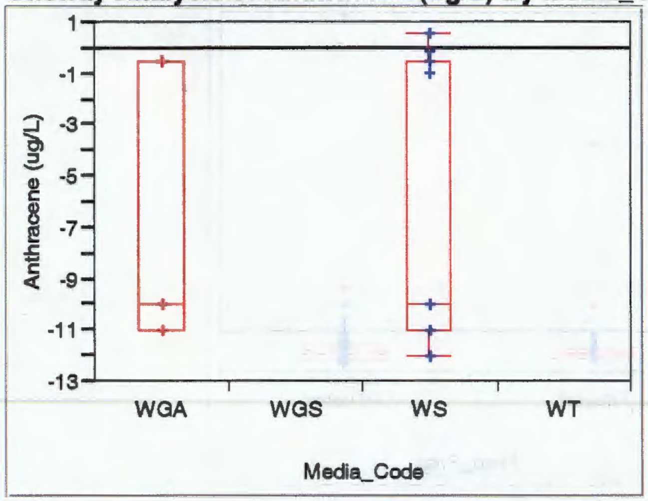


Bivariate Fit of Zinc (ug/L) By date_collected

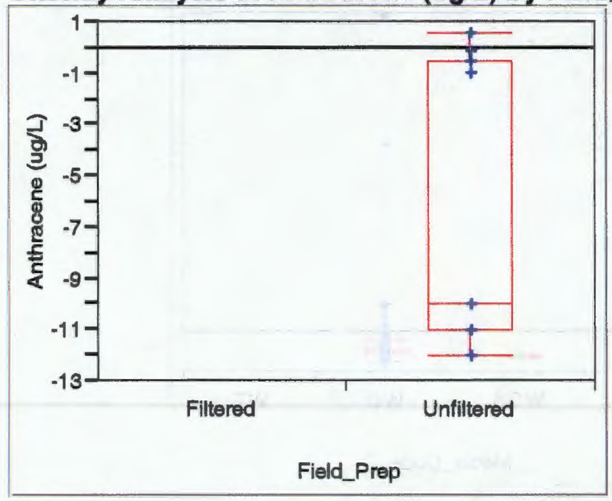


Dashed line – wildlife water ESL; Solid line – aquatic community ESL

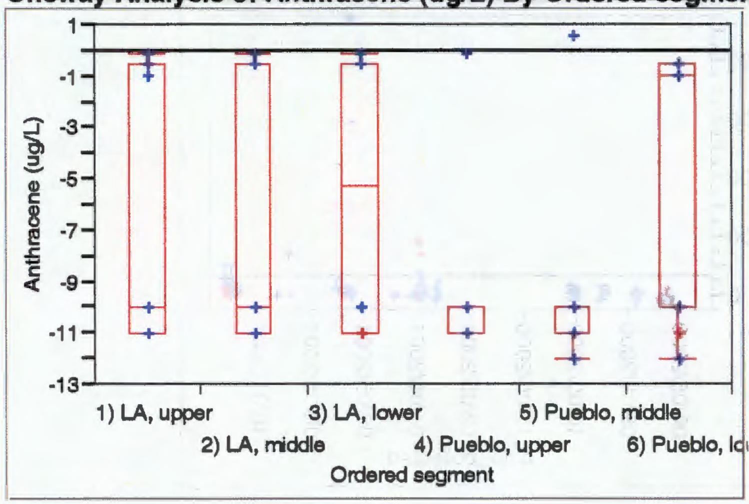
Oneway Analysis of Anthracene (ug/L) By Media_Code



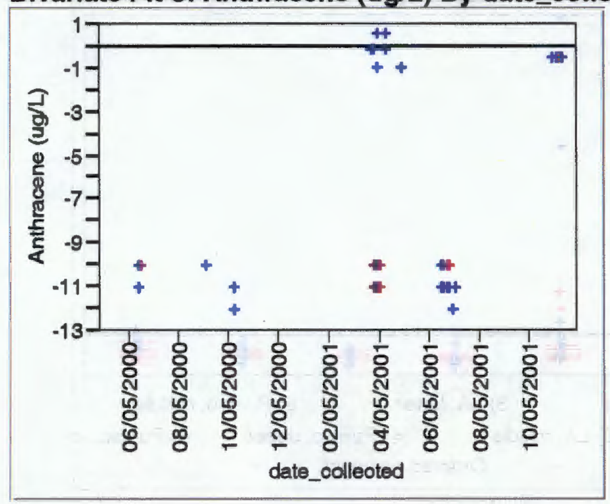
Oneway Analysis of Anthracene (ug/L) By Field_Prep



Oneway Analysis of Anthracene (ug/L) By Ordered segment

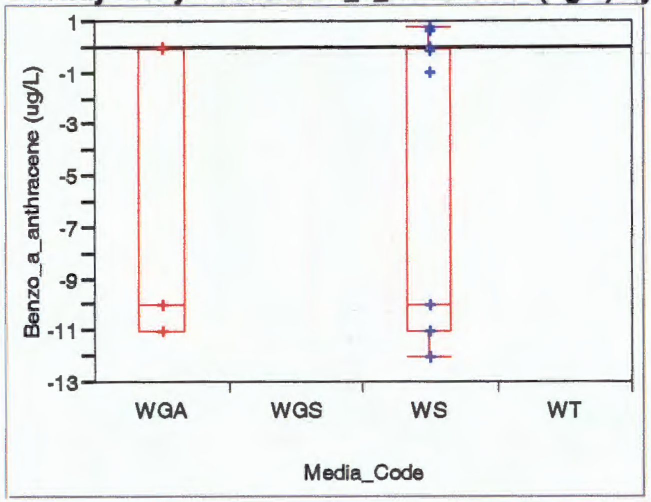


Bivariate Fit of Anthracene (ug/L) By date_collected

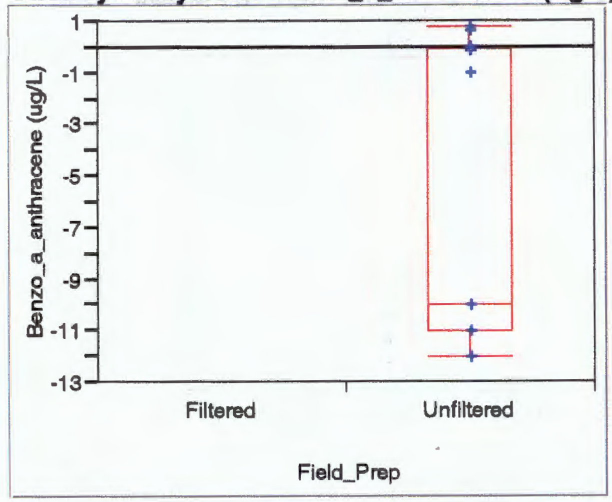


Dashed line – wildlife water ESL; Solid line – aquatic community ESL

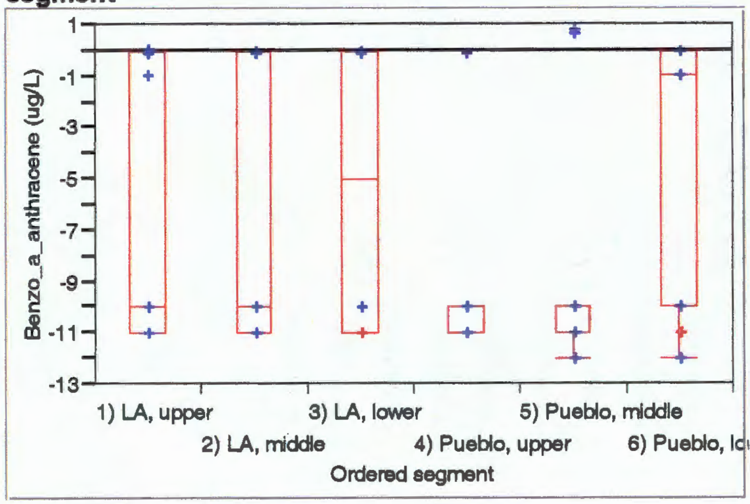
Oneway Analysis of Benzo_a_anthracene (ug/L) By Media_Code



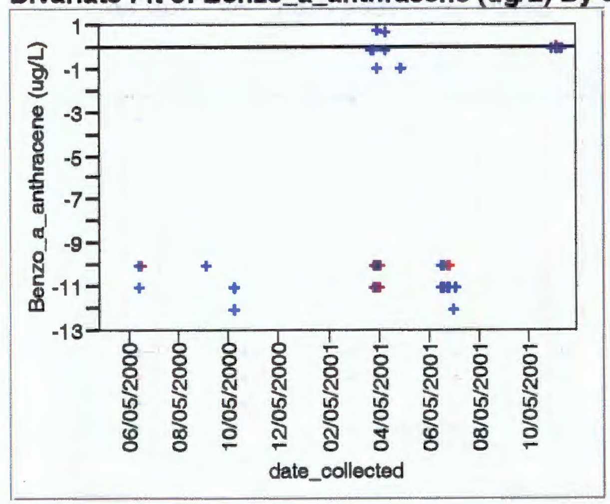
Oneway Analysis of Benzo_a_anthracene (ug/L) By Field_Prep



Oneway Analysis of Benzo_a_anthracene (ug/L) By Ordered segment

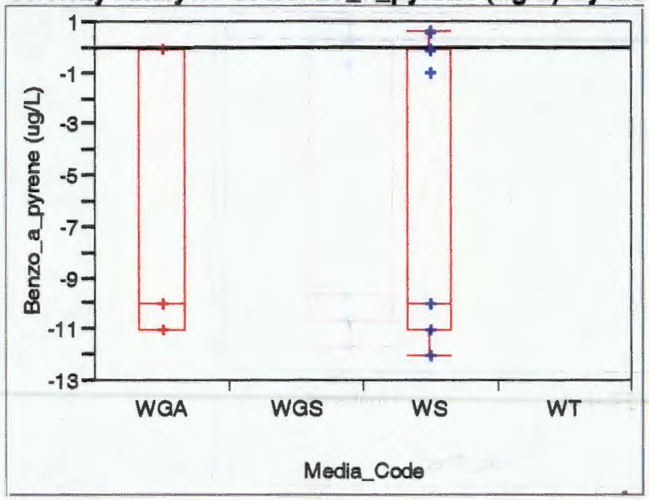


Bivariate Fit of Benzo_a_anthracene (ug/L) By date_collected

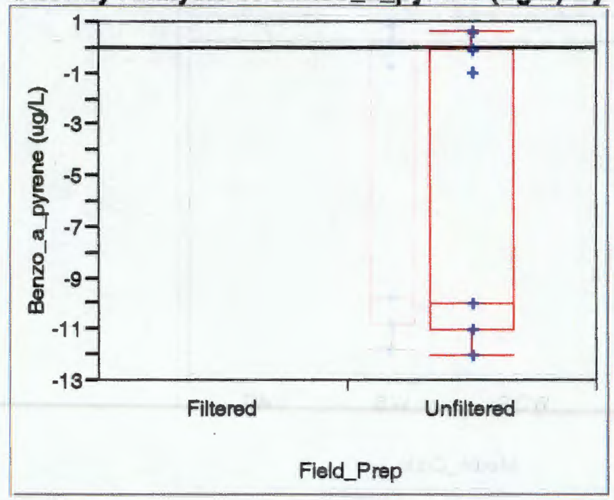


Dashed line – wildlife water ESL; Solid line – aquatic community ESL

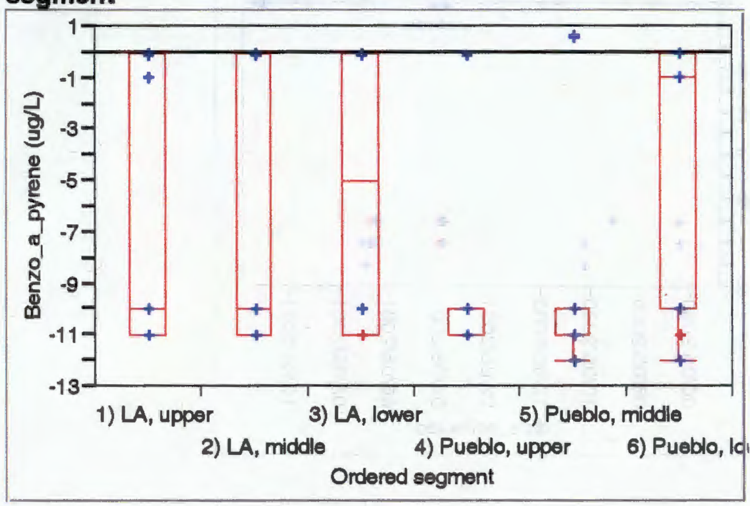
Oneway Analysis of Benzo_a_pyrene (ug/L) By Media_Code



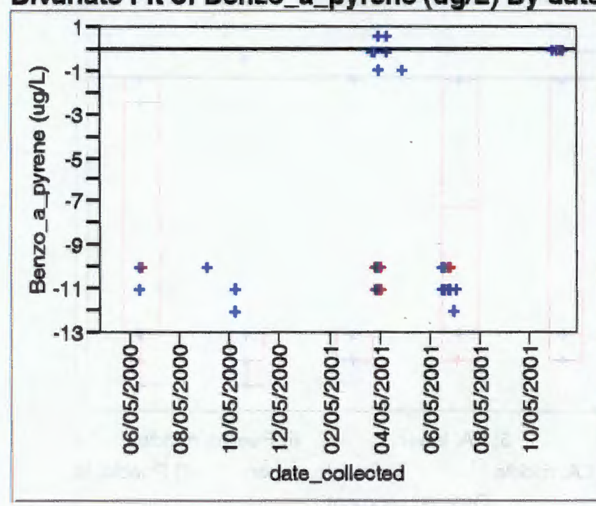
Oneway Analysis of Benzo_a_pyrene (ug/L) By Field_Prep



Oneway Analysis of Benzo_a_pyrene (ug/L) By Ordered segment



Bivariate Fit of Benzo_a_pyrene (ug/L) By date_collected

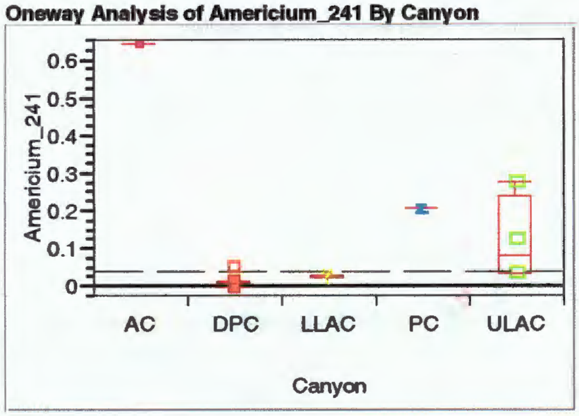


Dashed line – wildlife water ESL; Solid line – aquatic community ESL

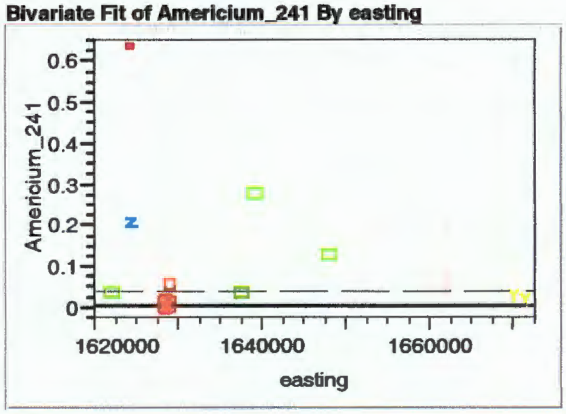
Group	name	sed COPEC	>ESL?	max detect c1	Bat ESL	Swallow ESL	Aq. Comm ESL	Bat HQ	Swallow HQ	Aq. Comm HQ	HQ >5?
inorg	Antimony	yes	yes	1.2	0.78	n/a	3	1.5	n/a	0.400	
inorg	Arsenic	yes	yes	5	1.1	29	12	4.5	0.172	0.417	
inorg	Barium	yes	yes	370	3.3	340	48	112	1.1	7.7	yes
inorg	Cobalt	yes	yes	8.1	0.12	0.074	n/a	68	109	n/a	yes
inorg	Cyanide__Total	yes	yes	2.5	420	0.14	0.1	0.006	18	25	yes
inorg	Lead	yes	yes	107	200	110	34	0.535	1.0	3.1	
inorg	Manganese	yes	yes	2100	850	6700	720	2.5	0.313	2.9	
inorg	Selenium	yes	yes	1.7	1.2	1.6	1	1.4	1.1	1.7	
inorg	Silver	yes	yes	0.36	0.12	20	1	3.0	0.018	0.360	
inorg	Thallium	yes	yes	0.86	0.44	n/a	n/a	2.0	n/a	n/a	
inorg	Titanium	yes	yes	409	98	n/a	n/a	4.2	n/a	n/a	
inorg	Zinc	yes	yes	140	290	130	150	0.483	1.1	0.933	
pah	Anthracene	yes	yes	0.069	290	n/a	0.00039	0.000	n/a	177	yes
pah	Benzo_a_anthracene	yes	yes	1.2	5.9	n/a	0.11	0.203	n/a	11	yes
pah	Benzo_b_fluoranthene	yes	yes	1.7	59	n/a	0.24	0.029	n/a	7.1	yes
pah	Chrysene	yes	yes	0.99	4.4	n/a	0.5	0.225	n/a	2.0	
pah	Indeno_1_2_3_cd_pyrene	yes	yes	0.55	93	n/a	0.078	0.006	n/a	7.1	yes
pah	Phenanthrene	yes	yes	2.7	14	n/a	0.85	0.193	n/a	3.2	
pah	Pyrene	yes	yes	3.6	20	n/a	0.57	0.180	n/a	6.3	yes
pest	Chlordane_alpha__	yes	yes	0.0018	2.7	3	0.0005	0.001	0.001	3.6	
pest	Chlordane_gamma__	yes	yes	0.0031	2.7	3	0.0005	0.001	0.001	6.2	yes
pest	DDT_4_4___	yes	yes	0.00599	1.3	0.0035	0.0015	0.005	1.7	4.0	
rad	Americium_241	yes	yes	0.64	260	220	0.0058	0.002	0.003	110	yes
rad	Americium_241_GS	yes	yes	1	260	220	0.0058	0.004	0.005	172	yes
rad	Cesium_137	yes	yes	6.27	3200	720	1.1	0.002	0.009	5.7	yes
rad	Europium_152	yes	yes	0.408	74	17	0.1	0.006	0.024	4.1	
rad	Plutonium_238	yes	yes	1.27	120	110	0.019	0.011	0.012	67	yes
rad	Plutonium_239	yes	yes	121	120	110	0.02	1.0	1.1	6050	yes
rad	Strontium_90	yes	yes	1.39	230	150	0.57	0.006	0.009	2.4	
rad	Uranium_234	yes	yes	1.68	2700	620	0.022	0.001	0.003	76	yes
rad	Uranium_235	yes	yes	0.133	3000	670	0.024	0.000	0.000	5.5	yes
rad	Uranium_235_GS	yes	yes	0.1219	3000	670	0.024	0.000	0.000	5.1	yes
rad	Uranium_238	yes	yes	1.69	3000	690	0.024	0.001	0.002	70	yes
svoc	Benzoic_Acid	yes	yes	0.75	15	n/a	0.065	0.050	n/a	12	yes
pah	Benzo_a_pyrene	yes	yes	0.74	14	n/a	0.35	0.053	n/a	2.1	
inorg	Calcium	n/a	n/a	15000	n/a	n/a	n/a	n/a	n/a	n/a	
rad	Ruthenium_106	n/a	n/a	0.85	n/a	n/a	n/a	n/a	n/a	n/a	
svoc	Carbazole	n/a	n/a	0.27	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Butylbenzene_sec__	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Carbon_Disulfide	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Propylbenzene_1__	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Styrene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Trichlorofluoromethane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Total_Uranium_by_ICPMS	n/a	n/a	n/a	38	29	n/a	n/a	n/a	n/a	
voc	Acetone	n/a	n/a	n/a	50	60000	0.065	n/a	n/a	n/a	
voc	Methylene_Chloride	n/a	n/a	n/a	24	n/a	0.38	n/a	n/a	n/a	
inorg	Cadmium			0.59	1	0.94	0.59	0.590	0.628	1.000	
inorg	Chromium__Total			26.7	2300	1600	56	0.012	0.017	0.477	
inorg	Copper			26	300	730	28	0.087	0.036	0.929	
inorg	Mercury			0.094	340	6.9	0.13	0.000	0.014	0.723	
inorg	Nickel			14	2000	2400	39	0.007	0.006	0.359	
inorg	Uranium			4	38	29	n/a	0.105	0.138	n/a	
pah	Benzo_g_h_i_perylene			0.27	16	n/a	0.29	0.017	n/a	0.931	
pah	Benzo_k_fluoranthene			0.18	93	n/a	0.24	0.002	n/a	0.750	
pah	Fluoranthene			2.8	34	n/a	2.9	0.082	n/a	0.966	
pah	Naphthalene			0.25	160	0.27	0.47	0.002	0.926	0.532	
pcb	Aroclor_1254			0.018	0.028	0.054	0.031	0.643	0.333	0.581	
pcb	Aroclor_1260			0.016	6.3	0.58	0.031	0.003	0.028	0.516	
rad	Cesium_134			0.24	1400	330	0.47	0.000	0.001	0.511	
rad	Cobalt_60			0.16	960	210	0.38	0.000	0.001	0.421	
rad	Sodium_22			0.11	49000	11000	90	0.000	0.000	0.001	
rad	Tritium			0.2	1.3E+09	3E+08	220000	0.000	0.000	0.000	
svoc	Bis_2_ethylhexyl_phthalate			0.8	38	1.3	n/a	0.021	0.615	n/a	
pest	Aldrin		nd	nd	n/a	n/a	n/a	n/a	n/a	n/a	
pest	DDD_4_4___		nd	nd	n/a	n/a	n/a	n/a	n/a	n/a	
pest	DDE_4_4___		nd	nd	8.3	0.0035	0.0022	n/a	n/a	n/a	

Group	name	sed COPEC	>ESL?	max detect c1	Bat ESL	Swallow ESL	Aq. Comm ESL	Bat HQ	Swallow HQ	Aq. Comm HQ	HQ >5?
voc	Ethylbenzene		nd	nd	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Trimethylbenzene_1_2_4__		nd	nd	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Boron		nd	nd	170	170	n/a	n/a	n/a	n/a	
inorg	Methylmercury__1__Ion		nd	nd	0.0039	0.00046	n/a	n/a	n/a	n/a	
pah	Acenaphthene		nd	nd	210	n/a	0.62	n/a	n/a	n/a	
pah	Dibenz_a_h_anthracene		nd	nd	19	n/a	0.015	n/a	n/a	n/a	
pah	Fluorene		nd	nd	370	n/a	0.54	n/a	n/a	n/a	
pah	Methylnaphthalene_2__		nd	nd	7.7	n/a	0.18	n/a	n/a	n/a	
pest	Dieldrin		nd	nd	0.052	0.12	0.052	n/a	n/a	n/a	
pest	Endrin_Aldehyde		nd	nd	0.25	0.016	0.01	n/a	n/a	n/a	
pest	Heptachlor_Epoxide		nd	nd	0.074	0.4	0.01	n/a	n/a	n/a	
svoc	Butylbenzylphthalate		nd	nd	440	n/a	13	n/a	n/a	n/a	
svoc	Dibenzofuran		nd	nd	0	n/a	2.3	n/a	n/a	n/a	
voc	Toluene		nd	nd	92	n/a	0.67	n/a	n/a	n/a	

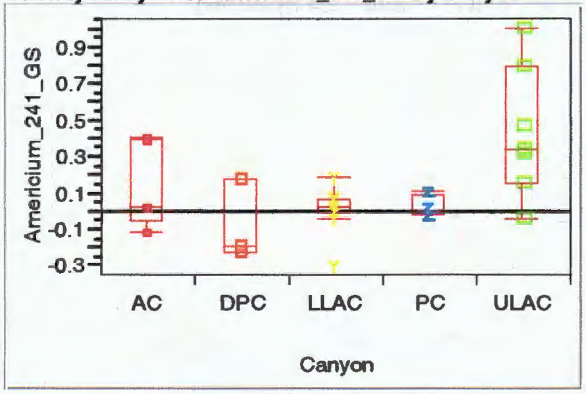
Oneway Analysis of Americium_241 By Canyon



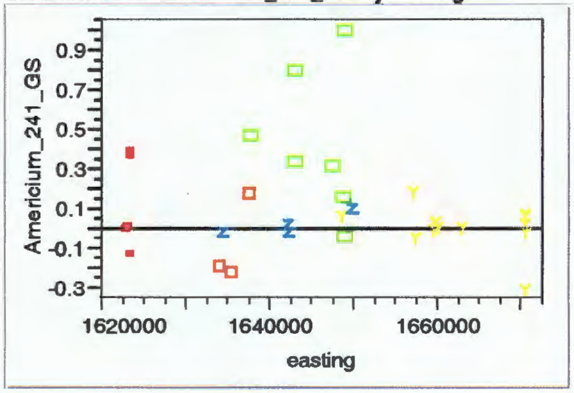
Bivariate Fit of Americium_241 By easting



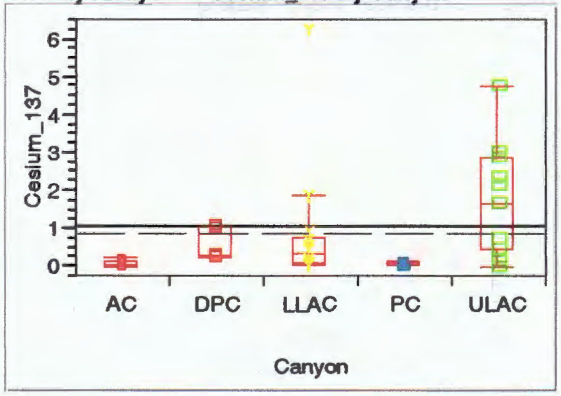
Oneway Analysis of Americium_241_GS By Canyon



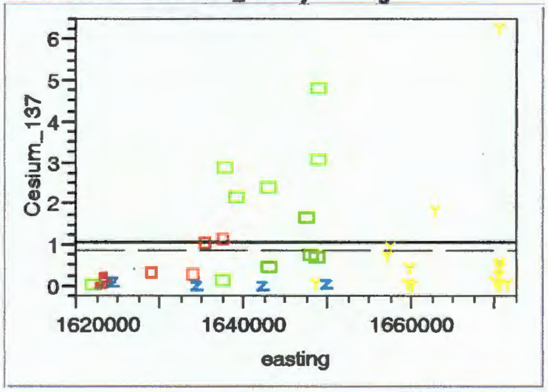
Bivariate Fit of Americium_241_GS By easting



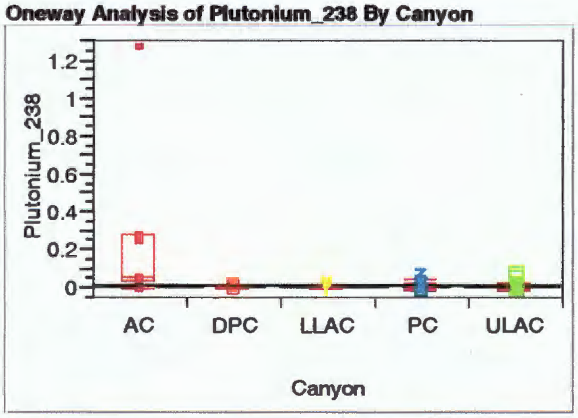
Oneway Analysis of Cesium_137 By Canyon



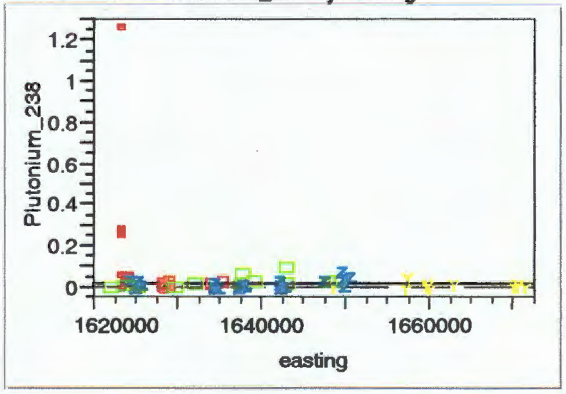
Bivariate Fit of Cesium_137 By easting



Oneway Analysis of Plutonium_238 By Canyon

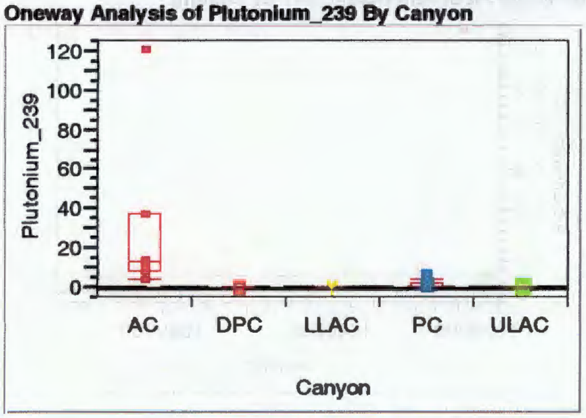


Bivariate Fit of Plutonium_238 By easting

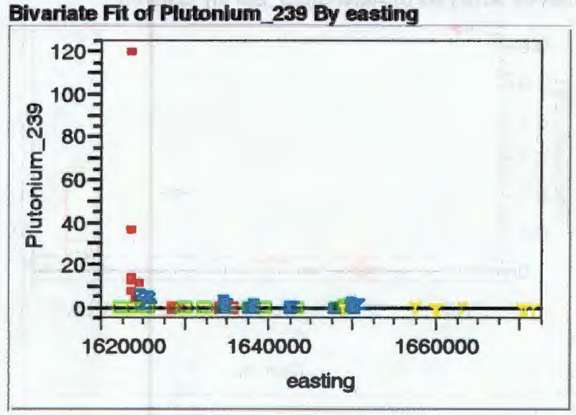


Solid line = aq comm. ESL; Blue dashed line = bat ESL; Red dashed line = bird ESL; long dashed line = BV

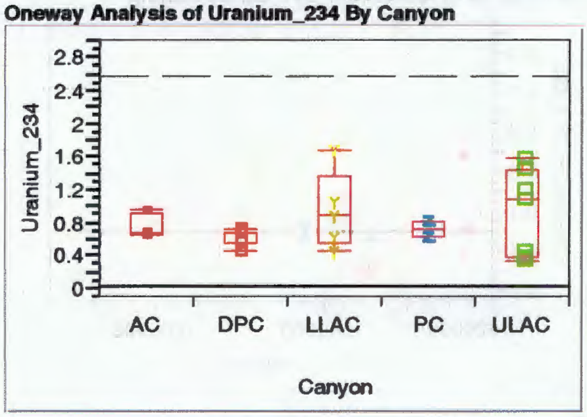
Oneway Analysis of Plutonium_239 By Canyon



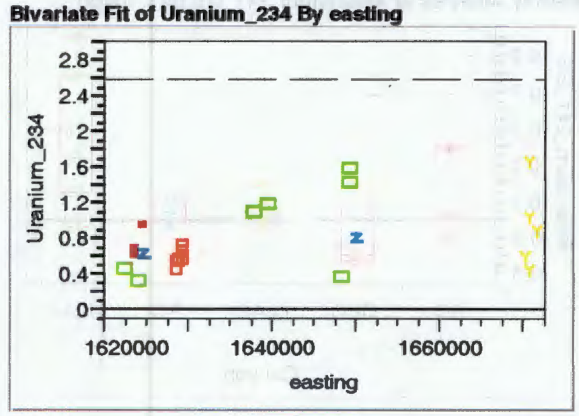
Bivariate Fit of Plutonium_239 By easting



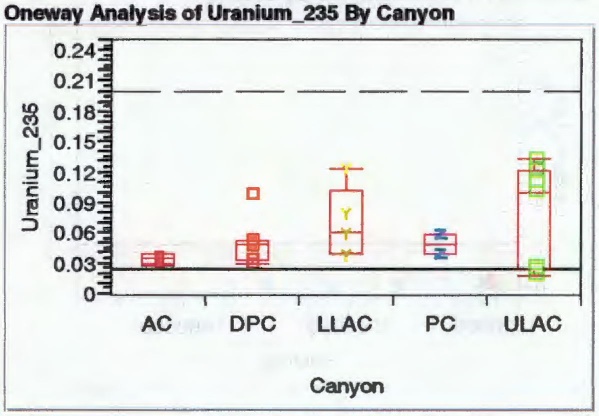
Oneway Analysis of Uranium_234 By Canyon



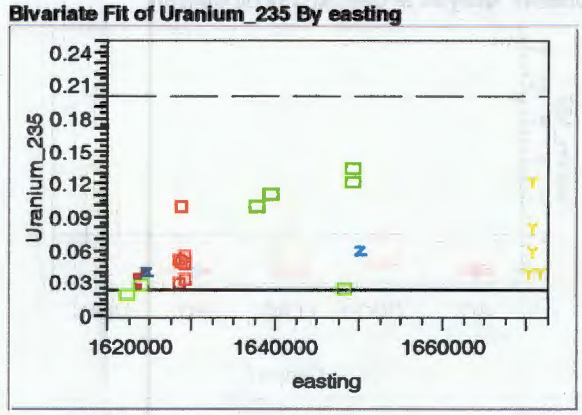
Bivariate Fit of Uranium_234 By easting



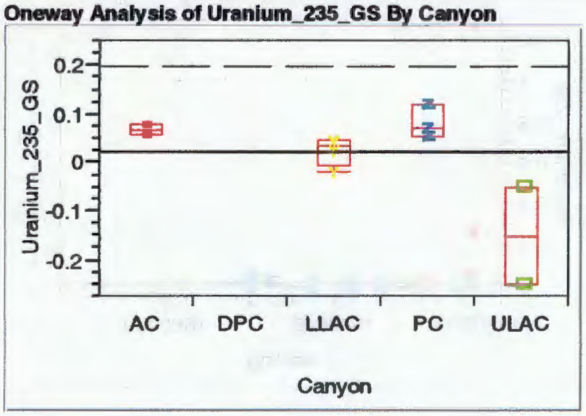
Oneway Analysis of Uranium_235 By Canyon



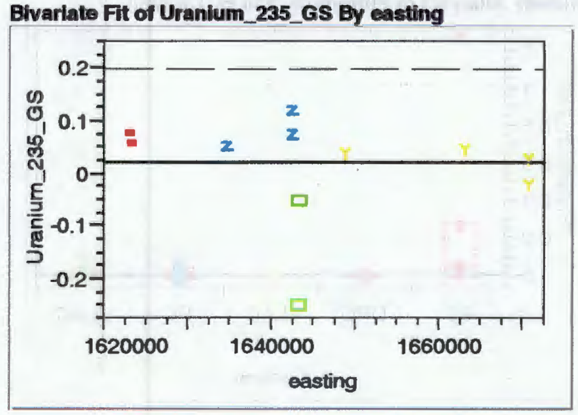
Bivariate Fit of Uranium_235 By easting



Oneway Analysis of Uranium_235_GS By Canyon

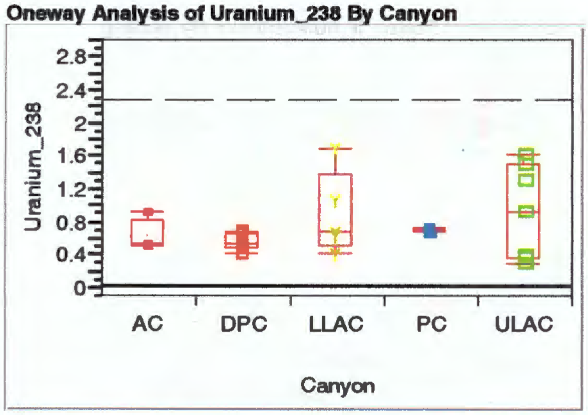


Bivariate Fit of Uranium_235_GS By easting

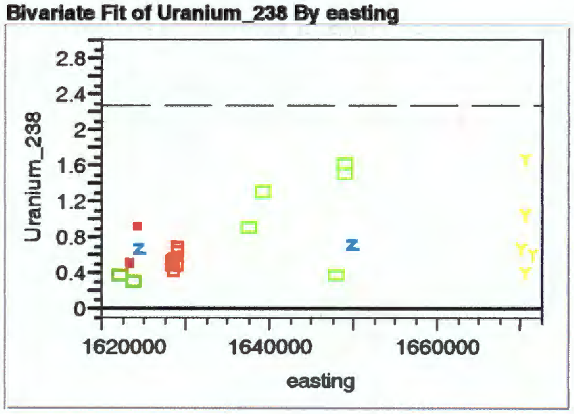


Solid line = aq comm. ESL; Blue dashed line = bat ESL; Red dashed line = bird ESL; long dashed line = BV

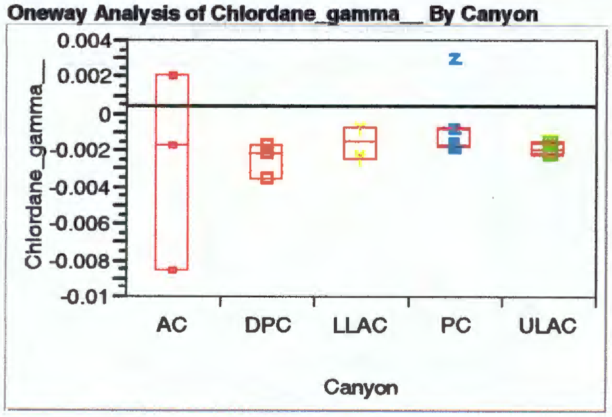
Oneway Analysis of Uranium_238 By Canyon



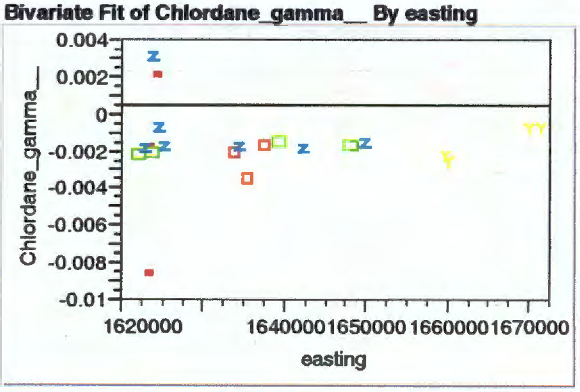
Bivariate Fit of Uranium_238 By easting



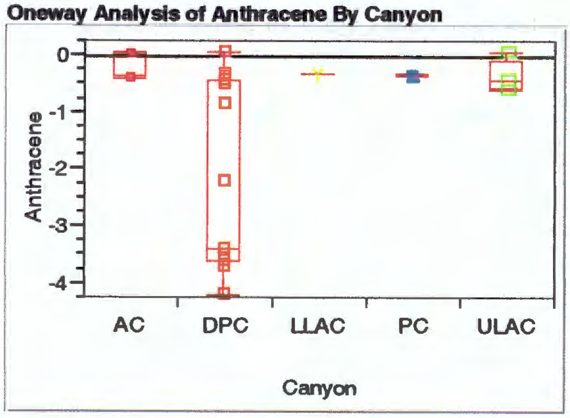
Oneway Analysis of Chlordane_gamma__ By Canyon



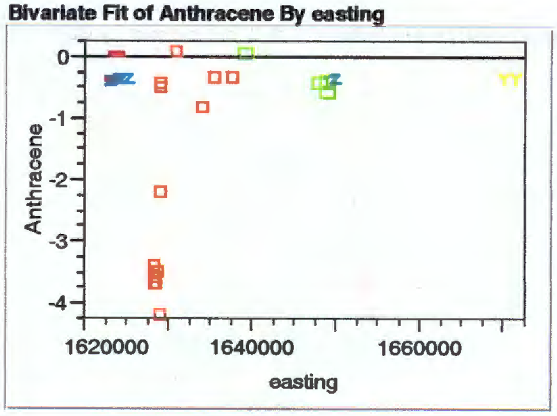
Bivariate Fit of Chlordane_gamma__ By easting



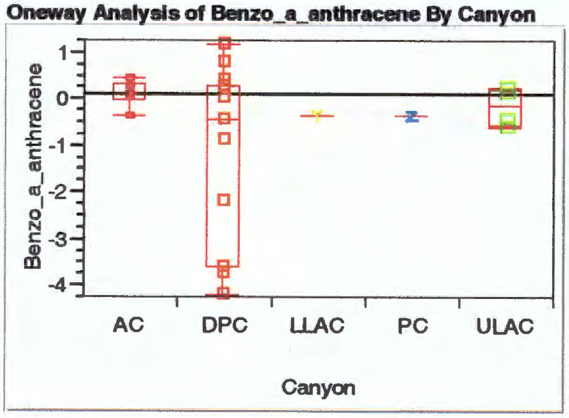
Oneway Analysis of Anthracene By Canyon



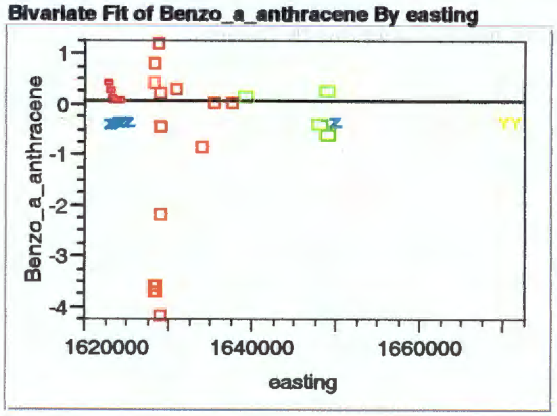
Bivariate Fit of Anthracene By easting



Oneway Analysis of Benzo_a_anthracene By Canyon

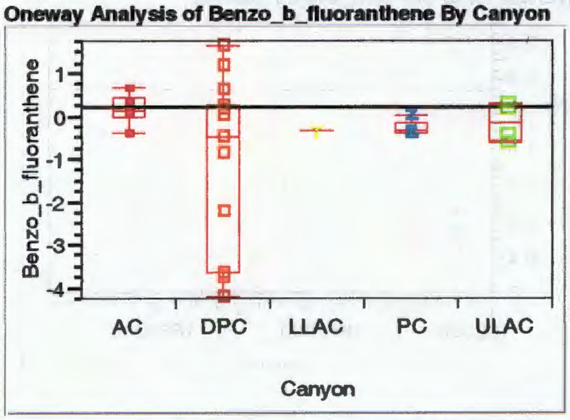


Bivariate Fit of Benzo_a_anthracene By easting

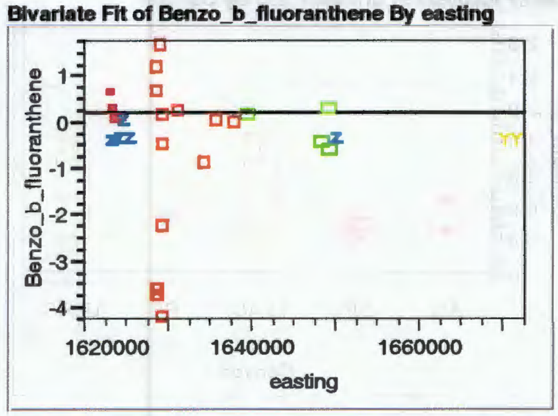


Solid line = aq comm. ESL; Blue dashed line = bat ESL; Red dashed line = bird ESL; long dashed line = BV

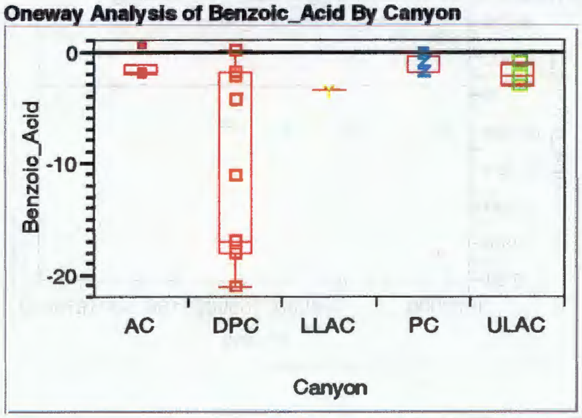
Oneway Analysis of Benzo_b_fluoranthene By Canyon



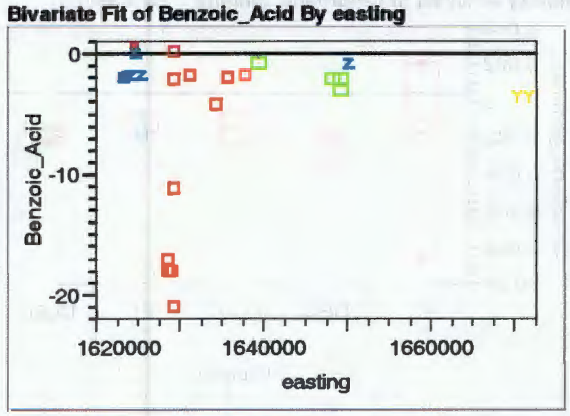
Bivariate Fit of Benzo_b_fluoranthene By easting



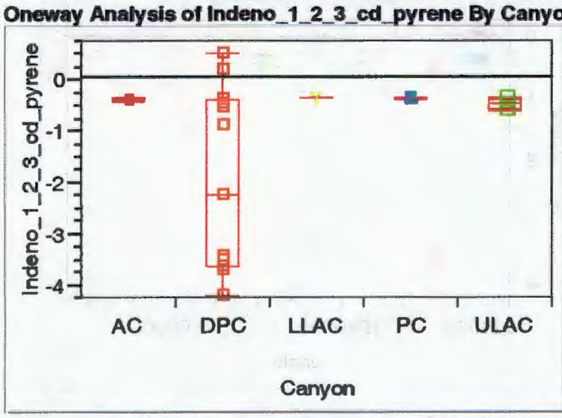
Oneway Analysis of Benzoic_Acid By Canyon



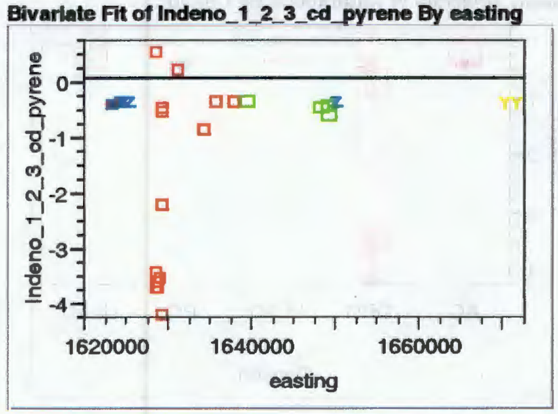
Bivariate Fit of Benzoic_Acid By easting



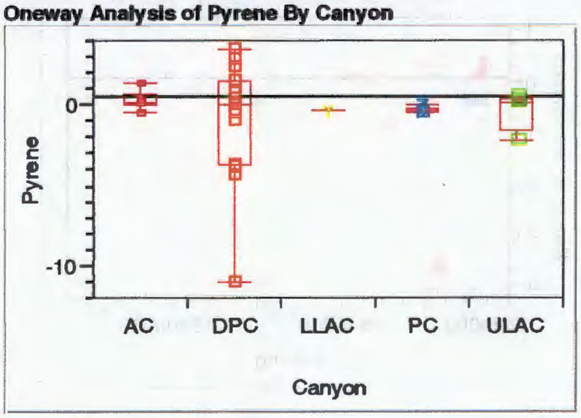
Oneway Analysis of Indeno_1_2_3_cd_pyrene By Canyon



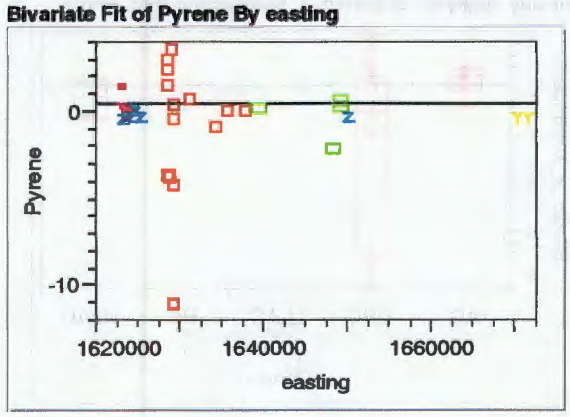
Bivariate Fit of Indeno_1_2_3_cd_pyrene By easting



Oneway Analysis of Pyrene By Canyon

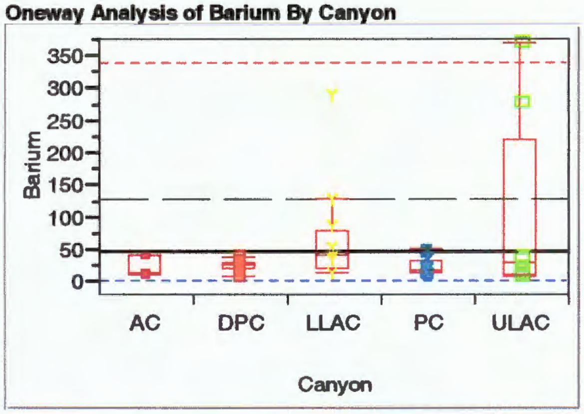


Bivariate Fit of Pyrene By easting

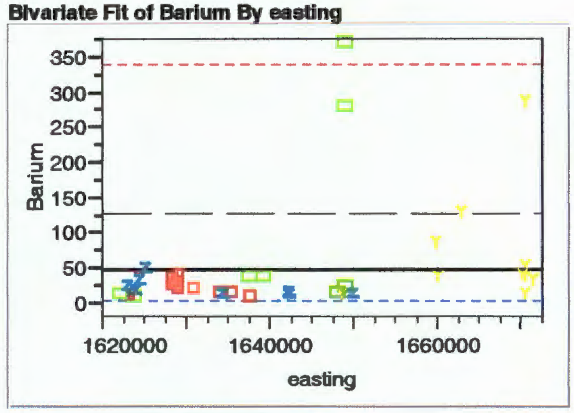


Solid line = aq comm. ESL; Blue dashed line = bat ESL; Red dashed line = bird ESL; long dashed line = BV

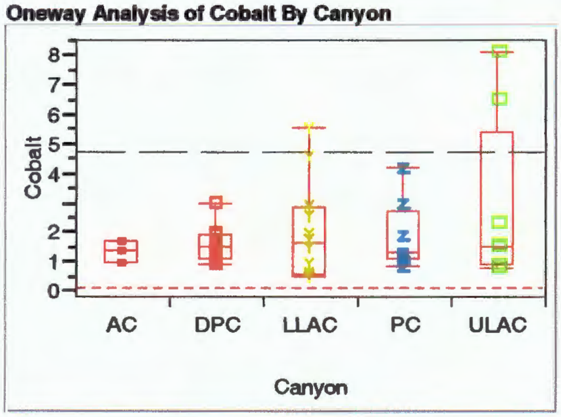
Oneway Analysis of Barium By Canyon



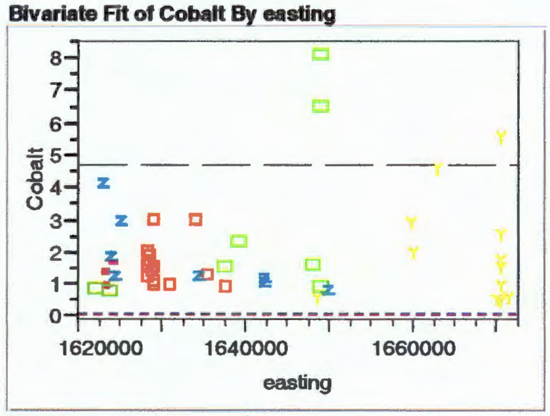
Bivariate Fit of Barium By easting



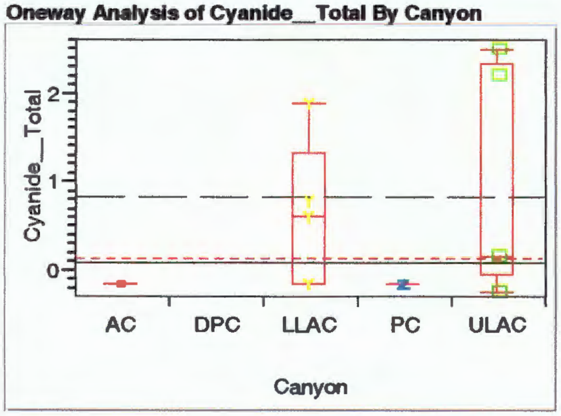
Oneway Analysis of Cobalt By Canyon



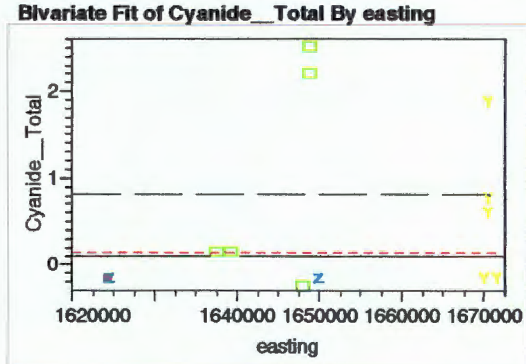
Bivariate Fit of Cobalt By easting



Oneway Analysis of Cyanide__Total By Canyon



Bivariate Fit of Cyanide__Total By easting



Solid line = aq comm. ESL; Blue dashed line = bat ESL; Red dashed line = bird ESL; long dashed line = BV

Group	name	max detect c1	HQ Kestrel	HQ Robin 50:50	HQ Robin invert	HQ Kestrel flesh	HQ Robin herb	HQ Desert cottontail	HQ Deer mouse	HQ Red fox	HQ Vagrant shrew	HQ Invert	HQ Plant	HQ >5?
inorg	Antimony	1.2	n/a	n/a	n/a	n/a	n/a	0.19	1.2	0.01	2.1	n/a	24	yes
inorg	Arsenic	5	0.04	0.16	0.26	2E-3	0.05	0.24	2.9	0.05	6.0	0.74	0.5	yes
inorg	Barium	370	0.22	0.97	1.6	0.01	0.37	11	82	0.88	154	n/a	3.7	yes
inorg	Cadmium	0.59	0.12	0.45	0.83	9E-4	0.07	0.02	0.37	8E-4	0.68	5.9	0.59	yes
inorg	Chromium__Total	26.7	0.01	0.05	0.06	0.00	0.04	3E-3	0.01	0.00	0.04	19	11	yes
inorg	Cobalt	8.1	21	87	159	1.4	18	1.6	43	0.81	89	n/a	32	yes
inorg	Copper	26	0.01	0.08	0.07	1E-3	0.10	0.09	0.15	3E-3	0.15	2.0	2.6	
inorg	Cyanide__Total	2.5	4.1	25	25	1.8	25	3E-3	0.01	5E-04	0.01	n/a	n/a	yes
inorg	Lead	107	0.21	1.5	1.9	0.04	1.1	0.12	0.49	0.02	1.1	0.05	0.24	
inorg	Manganese	2100	0.07	0.50	0.55	0.01	0.46	1.2	2.9	0.06	4.0	n/a	42	yes
inorg	Mercury	0.094	3E-3	0.02	0.03	1E-3	0.01	4E-5	2E-4	2E-5	5E-4	1.9	3E-3	
inorg	Selenium	1.7	0.20	0.85	1.5	0.01	0.17	0.03	0.89	0.02	1.9	0.22	17	yes
inorg	Silver	0.36	4E-3	0.02	0.03	2E-4	0.01	0.69	2.6	0.03	4.0	n/a	7.2	yes
inorg	Thallium	0.86	n/a	n/a	n/a	n/a	n/a	0.03	1.3	0.03	2.7	n/a	8.6	yes
inorg	Titanium	409	n/a	n/a	n/a	n/a	n/a	0.07	2.7	0.06	5.7	n/a	n/a	yes
inorg	Zinc	140	0.21	1.1	1.4	0.03	0.67	0.13	0.44	0.01	0.61	0.40	14	yes
pah	Naphthalene	0.25	0.19	1.0	1.3	0.02	0.74	5E-4	1E-3	3E-05	2E-3	n/a	n/a	
pest	DDT_4_4___	0.006	0.64	1.2	2.3	0.65	0.05	3E-5	0.00	1E-3	0.01	n/a	2E-3	
rad	Plutonium_239	121	4E-3	0.06	0.06	8E-4	0.01	7E-4	8E-4	4E-3	1E-3	2.6	8E-4	
rad	Ruthenium_106	0.85	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Calcium	15000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
svoc	Carbazole	0.27	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
svoc	Benzoic_Acid	0.75	n/a	n/a	n/a	n/a	n/a	0.07	0.10	0.00	0.07	n/a	n/a	
svoc	Bis_2_ethylhexyl_phthalate	0.8	0.35	0.42	0.80	0.47	0.03	0.00	0.01	0.01	0.03	n/a	n/a	
rad	Sodium_22	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
rad	Uranium_235_GS	0.1219	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
rad	Uranium_235	0.133	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
rad	Cobalt_60	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
rad	Tritium	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
rad	Cesium_134	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
rad	Europium_152	0.408	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
rad	Americium_241	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	
rad	Americium_241_GS	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	
rad	Plutonium_238	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	
rad	Strontium_90	1.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
rad	Uranium_234	1.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	
rad	Uranium_238	1.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	
rad	Cesium_137	6.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	
pest	Chlordane_alpha__	0.0018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00	
pest	Chlordane_gamma__	0.0031	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00	
pcb	Aroclor_1260	0.016	0.01	0.02	0.04	0.01	0.00	0.00	0.00	0.00	0.00	n/a	n/a	
pcb	Aroclor_1254	0.018	0.11	0.23	0.44	0.08	0.01	0.01	0.40	0.12	0.82	n/a	0.00	
pah	Anthracene	0.069	n/a	n/a	n/a	n/a	n/a	0.00	0.00	0.00	0.00	n/a	n/a	
pah	Benzo_k_fluoranthene	0.18	n/a	n/a	n/a	n/a	n/a	0.00	0.00	0.00	0.00	n/a	n/a	
pah	Benzo_g_h_i_perylene	0.27	n/a	n/a	n/a	n/a	n/a	0.00	0.01	0.01	0.02	n/a	n/a	
pah	Indeno_1_2_3_cd_pyrene	0.55	n/a	n/a	n/a	n/a	n/a	0.00	0.00	0.00	0.01	n/a	n/a	
pah	Benzo_a_pyrene	0.74	n/a	n/a	n/a	n/a	n/a	0.01	0.04	0.01	0.08	n/a	n/a	
pah	Chrysene	0.99	n/a	n/a	n/a	n/a	n/a	0.08	0.24	0.04	0.41	n/a	n/a	
pah	Benzo_a_anthracene	1.2	n/a	n/a	n/a	n/a	n/a	0.10	0.24	0.04	0.40	n/a	0.07	
pah	Benzo_b_fluoranthene	1.7	n/a	n/a	n/a	n/a	n/a	0.00	0.02	0.01	0.04	n/a	0.09	
pah	Phenanthrene	2.7	n/a	n/a	n/a	n/a	n/a	0.02	0.14	0.01	0.25	n/a	n/a	
pah	Fluoranthene	2.8	n/a	n/a	n/a	n/a	n/a	0.00	0.06	0.01	0.11	n/a	n/a	
pah	Pyrene	3.6	n/a	n/a	n/a	n/a	n/a	0.01	0.12	0.01	0.24	n/a	n/a	
inorg	Uranium	4	0.03	0.11	0.20	0.00	0.02	0.00	0.07	0.00	0.15	n/a	0.16	
inorg	Nickel	14	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.00	0.02	0.14	0.70	
voc	Butylbenzene_sec__	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Carbon_Disulfide	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Propylbenzene_1__	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Styrene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Trichlorofluoromethane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Acetone	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Methylene_Chloride	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Methylmercury__1__Ion	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	n/a	
pah	Acenaphthene	nd	n/a	n/a	n/a	n/a	n/a	nd	nd	nd	nd	n/a	nd	
pest	DDE_4_4___	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	n/a	n/a	
pest	Endrin_Aldehyde	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	n/a	nd	
pah	Fluorene	nd	n/a	n/a	n/a	n/a	n/a	nd	nd	nd	nd	nd	n/a	
pest	Heptachlor_Epoxide	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	n/a	nd	

Group	name	max detect c1	HQ Kestrel	HQ Robin 50:50	HQ Robin invert	HQ Kestrel flesh	HQ Robin herb	HQ Desert cottontail	HQ Deer mouse	HQ Red fox	HQ Vagrant shrew	HQ Invert	HQ Plant	HQ >5?
pest	Aldrin	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
pest	DDD_4_4__	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Ethylbenzene	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
voc	Trimethylbenzene_1_2_4__	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
inorg	Boron	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	n/a	nd	
inorg	Total_Uranium_by_ICPMS	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	n/a	nd	
pah	Dibenz_a_h_anthracene	nd	n/a	n/a	n/a	n/a	n/a	nd	nd	nd	nd	n/a	n/a	
pah	Methylnaphthalene_2__	nd	n/a	n/a	n/a	n/a	n/a	nd	nd	nd	nd	n/a	n/a	
pest	Dieldrin	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	n/a	nd	
svoc	Butylbenzylphthalate	nd	n/a	n/a	n/a	n/a	n/a	nd	nd	nd	nd	n/a	n/a	
svoc	Dibenzofuran	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	nd	
voc	Toluene	nd	n/a	n/a	n/a	n/a	n/a	nd	nd	nd	nd	n/a	nd	

July 18, 2002

Proposed locations for aquatic toxicity testing

Type*	Hydro segment	Location	COPECs	Fire-impacted?	Reference?
Wet	Upper LAC	Skate rink in reach LA-0	low detections of organics	Yes	Yes
	Upper LAC	Reach LA-1FW	med detections of organics [PAHs, PCBs]	Yes	No
	Middle LAC	Upper DP Canyon bedrock pools in reaches DP-1W,C	detections of organics [PAHs]	No	No
	Lower PC	Bayo WWTP in reach P-3~~W~~E 7/18/02 KO	med detections of rads, Bayo WWTP influence	Yes	No
	Lower LAC	Basalt Spring in reach LA-4W	low detections of rads, Bayo WWTP influence	Yes	No
Moist	Upper LAC	Reach LA-1W	low rad detections, PCBs	Yes	No
	Middle LAC	DP Spring at head of reach DP-4	med-high rad detections	No	No
	Middle LAC	Reach LA-3W	low rad detections	Yes	No
	Upper PC	Reach P-1FW	N/A	Yes	Yes
	Middle PC	Reach AC-1	detections of organics [PAHs]	No	No
	Middle PC	Reach AC-3	high rad detections [isoPu, Am-241]	No	No
	Lower LAC	Reach LA-5	low rad detections	Yes	No

* Type: Wet - should have both water and sediment to test
Moist - likely to only have sediments to test

SubReach	Distance from Rio Grande	Cyanide__Total	Americium_241_GS	Plutonium_239	Aroclor_1254	Aroclor_1260	Chlordane_alpha_	Chlordane_gamma_	DDE_4_4__	DDT_4_4__	Endrin_Aldehyde	Acenaphthene	Anthracene	Benzo_a_anthracene	Benzo_b_fluoranthene	Bis_2_ethylhexyl_phthalate	Chrysene	Indeno_1_2_3_cd_pyrene	Naphthalene	Phenanthrene	Pyrene
DP-1W	16.4	.	0.17	0.048	0.257	0.257	0.094	0.095	0.034	0.06	0.034	1.893	1.47	1.124	1.453	1.127	1.233	1.809	1.703	1.379	3.479
DP-1C	16.3	.	0.15	0.011	0.038	0.129	.	.	.	.	.	0.836	0.798	0.755	0.843	0.744	0.747	0.893	0.873	0.911	1.426
DP-1E	15.5	.	0.086	0.058	0.052	0.077	0.013	0.012	0.02	0.02	0.02	1.258	1.248	0.986	1.023	0.778	0.984	1.282	1.261	0.62	1.101
DP-2	14.7	.	4.242	2.595	0.037	0.079	0.011	0.012	0.006	0.04	0.006	0.451	0.401	0.34	0.432	0.488	0.383	0.403	0.412	0.437	0.948
DP-3	13.8	.	10.95	4.191	0.045	0.054	0.004	0.004	0.005	0.015	0.005	0.816	0.816	0.525	0.428	0.921	0.52	0.715	0.816	0.521	0.494
DP-4	13.1	0.15	5.032	5.293	0.026	0.028	0.006	0.004	0.004	0.01	0.003	1.14	1.123	1.129	1.12	1.114	1.137	1.135	1.141	1.112	1.15
LA-0	19.5	.	.	.	0.019	0.046	1E-03	0.001	0.01	0.023	0.002	0.635	0.635	0.628	0.627	0.618	0.63	0.635	0.635	0.629	0.993
LA-1FW	18.4	.	.	0.017	0.019	0.03	0.001	0.002	0.003	0.012	0.002	0.624	0.621	0.62	0.609	0.605	0.748	0.624	0.624	0.651	0.859
LA-1W+	17.5	.	.	0.306	0.372	0.097	1E-03	1E-03	0.003	0.011	0.002	0.198	0.198	0.191	0.201	0.446	0.186	0.184	0.198	0.206	0.788
LA-1W	17.2	.	.	3.789	0.382	0.054	0.003	0.003	0.002	0.007	0.002	0.198	0.198	0.167	0.198	0.124	0.136	0.198	0.165	0.172	0.967
LA-1C	15.7	.	0.017	1.224	0.203	0.352	0.003	0.006	0.005	0.061	0.016	0.397	0.399	0.318	0.28	0.459	0.3	0.329	0.401	0.334	0.366
LA-1E	14.8	.	.	2.589	0.039	0.217	0.001	0.002	0.004	0.01	0.003	0.205	0.202	0.214	0.199	0.295	0.213	0.179	0.205	0.328	0.85
LA-2W	13.0	0.113	0.218	1.87	0.03	0.28	0.035	0.035	0.036	0.044	0.036	0.199	0.165	0.147	0.146	0.226	0.144	0.181	0.194	0.179	0.478
LA-2E	12.6	0.135	5.812	1.658	0.017	0.081	8E-04	8E-04	0.002	0.002	0.002	0.182	0.05	0.223	0.39	0.177	0.252	0.203	0.157	0.233	0.386
LA-2FE	11.2	.	1.166	1.802	0.007	0.263	0.007	0.007	0.008	0.029	0.004	0.175	0.184	0.162	0.147	0.178	0.185	0.164	0.192	0.277	0.445
LA-3W	10.5	.	1.527	1.209	0.021	0.144	0.005	0.005	0.005	0.022	0.005	0.211	0.188	0.184	0.196	0.219	0.216	0.189	0.211	0.201	0.575
LA-3	9.3	0.131	1.268	0.977	0.018	0.078	0.001	0.002	0.003	0.006	0.001	0.414	0.414	0.413	0.425	0.409	0.424	0.412	0.414	0.408	0.603
LA-3E	8.8	2.35	0.48	1.235	.	.	.	.	.	.	.	0.255	0.255	0.275	0.315	0.255	0.285	0.255	0.275	0.38	0.43
LA-4W	6.0	.	0.3	3.217	0.02	0.02	0.001	0.001	0.002	0.004	0.002	.	.	.	.	.	.	.	.	.	.
LA-4E	5.0	.	0.062	1.037	0.02	0.02	0.001	0.001	0.002	0.002	0.002	.	.	.	.	.	.	.	.	.	.
LA-4FE	4.3	.	-0.01	0.48	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LA-5	0.9	0.309	-0.12	0.524	0.007	0.007	3E-04	3E-04	3E-04	3E-04	3E-04	0.189	0.189	0.189	0.189	0.062	0.189	0.189	0.189	0.189	0.189
LA-5E	0.1	1.382	-0.05	0.348	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Baseline	20.0	.	0.235	0.368	.	.	.	.	.	.	.	0.309	0.309	0.309	0.309	0.309	0.309	0.309	1.019	0.386	0.309
AC-1	19.1	.	0.226	0.062	0.051	0.072	0.017	0.022	0.015	0.053	0.008	0.58	0.895	1.83	2.662	0.512	1.872	0.793	0.742	3.548	4.408
AC-2	18.8	.	0.019	0.321	0.033	0.049	0.008	0.015	0.007	0.03	0.005	0.507	0.65	1.473	2.707	0.633	1.593	0.7	0.487	2.657	3.44
ACS	18.6	.	0.392	36.25	0.034	0.017	0.003	0.004	0.007	0.039	0.004	0.409	0.397	0.405	0.403	0.428	0.414	0.418	0.424	0.429	0.541
AC-3	18.3	0.288	14.11	62.9	0.988	0.15	0.005	0.006	0.01	0.03	0.008	0.24	0.261	0.512	0.769	0.211	0.479	0.262	0.287	0.873	0.943
P-1FW	18.5	.	.	.	0.025	0.029	0.002	0.002	0.002	0.008	0.002	0.201	0.201	0.201	0.201	0.221	0.201	0.201	0.201	0.195	0.201
P-1W	18.3	0.313	0.02	0.12	0.018	0.08	0.008	0.008	0.002	0.01	0.002	0.176	0.19	0.248	0.343	0.445	0.243	0.181	0.164	0.352	0.44
P-1E	17.8	0.351	0.65	36.46	0.053	0.049	0.002	3E-04	3E-04	0.002	3E-04	0.161	0.231	0.477	0.872	0.164	0.519	0.343	0.163	0.681	0.918
WC	17.8	.	.	.	0.017	0.017	9E-04	9E-04	0.002	0.002	0.002	0.171	0.171	0.171	0.171	0.171	0.171	0.171	0.171	0.171	0.171
P-2W	14.6	.	0.412	9.894	0.019	0.029	9E-04	9E-04	0.002	0.002	0.002	.	.	.	.	.	.	.	.	.	.
P-2E	13.3	.	0.972	3.057	0.022	0.022	0.001	0.001	0.002	0.002	0.002	.	.	.	.	.	.	.	.	.	.
P-3W	11.4	.	0.088	1.918	0.019	0.022	1E-03	1E-03	0.002	0.002	0.002	.	.	.	.	.	.	.	.	.	.
P-3E	10.4	.	0.003	1.275	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
P-4W	9.5	0.56	0.695	9.423	0.015	0.015	8E-04	8E-04	0.002	0.002	0.002	0.181	0.219	0.279	0.324	0.168	0.277	0.24	0.22	0.503	0.36
P-4E	8.6	0.225	0.135	2.594	0.015	0.015	8E-04	8E-04	0.002	0.002	0.002	0.167	0.167	0.141	0.167	0.167	0.141	0.167	0.167	0.167	0.144
?		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

SubReach	Antimony	Antimony - detects	Arsenic	Barium	Cadmium	Chromium__Total	Cobalt	Copper	Lead	Manganese	Mercury	Selenium	Silver	Thallium	Zinc	Methylmercury__1_Ion	Titanium	Total_Uranium_by_ICPMS	Uranium
DP-1W	0.551	0.913	1.713	65.91	0.191	8.671	2.743	10.49	73.53	184.1	0.058	0.446	0.087	0.33	85.46	.	.	.	.
DP-1C	0.357	0.723	1.949	55.52	0.116	8.43	2.691	8.287	55.2	253.7	0.042	0.23	0.401	0.213	58.24	.	.	.	.
DP-1E	0.509	1.04	2.151	55.71	0.214	11.18	2.503	8.757	96.51	243.4	0.035	0.338	0.102	0.322	70.26	.	.	.	.
DP-2	1.733	1.03	1.959	65.39	0.172	5.572	3.221	8.25	40.78	299.3	0.039	0.403	0.352	0.262	52.68	.	.	.	.
DP-3	0.416	1.1	1.611	48.69	0.125	6.23	2.59	4.596	34.09	191.8	0.022	0.337	0.132	0.329	36.13	.	.	.	.
DP-4	0.563	.	1.791	50.15	0.048	4.153	2.204	12.33	30.9	232.1	0.02	0.283	0.123	0.246	41.26	.	88.8	.	6.8
LA-0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LA-1FW	0.21	.	1.277	35.73	0.012	2.517	1.693	8.767	22.13	175.3	0.007	0.333	0.043	0.158	26.63	.	.	.	.
LA-1W+	0.201	.	1.45	53	0.012	4.48	2.142	7.66	29.8	200.2	0.033	0.309	0.042	0.154	34.18	.	.	.	.
LA-1W	2.829	.	1.456	63.91	0.243	4.438	2.925	8.825	35.1	254.1	0.053	0.302	0.739	0.129	42.73	.	.	.	.
LA-1C	2.294	1.813	2.023	45.11	0.142	9.765	1.919	6.522	17.23	202	0.24	0.299	0.937	0.087	58.95	.	.	1.181	.
LA-1E	2.168	.	1.4	84.8	0.19	6.333	2.8	13.07	19.9	246	0.067	0.356	0.598	0.135	35.8	.	.	.	.
LA-2W	2.266	.	2.13	60.22	0.118	10.08	2.24	7.66	27	266.6	0.118	0.373	3.429	0.259	54.44	.	180.5	.	4.8
LA-2E	3.208	.	1.617	52.7	0.232	8.5	1.9	5.917	29.68	275.5	0.028	0.3	0.267	0.163	59.45	.	204.4	.	5.24
LA-2FE	0.485	0.485	2.083	63.33	0.153	8.25	2.517	7.033	26.67	275	0.063	0.435	0.068	0.106	40.17	.	.	.	.
LA-3W	0.348	0.453	1.767	53.5	0.091	6.167	2.217	6.367	24.5	240	0.043	0.218	0.037	0.118	41.83	.	.	.	.
LA-3	2.95		1.156	52.69	0.244	6.55	2.575	7.913	25.7	250.8	0.039	0.133	0.869	0.084	42.16	.	.	.	4.256
LA-3E	0.376	0.64	3.15	276.5	0.468	9.3	6.55	19.08	39.75	1488	0.078	1.22	0.083	0.449	110.9	.	.	.	.
LA-4W	2.072	.	1.048	52.52	0.213	3.66	2.22	8.06	21.84	202.2	0.031	0.162	0.327	0.162	25.98	.	.	.	.
LA-4E	1.229	.	1.314	52.66	0.112	2.749	2.263	5.534	7.914	218	0.015	0.231	0.149	0.255	21.33	.	.	.	.
LA-4FE	0.384	0.512	2.189	127.3	0.022	6.7	4.663	11.05	17.86	535	0.021	0.234	0.162	0.199	52.88	.	.	.	.
LA-5	2.464		0.606	66.56	0.173	4.757	2.181	4.1	8.7	181.2	0.02	0.226	0.148	0.15	21.6	.	209.4	.	3.553
LA-5E	0.398	0.444	2.337	148.2	0.207	4.4	3.908	8.367	17.82	628.3	0.013	0.59	0.04	0.255	34.13	.	.	.	.
Baseline	0.489	0.568	4.843	648.6	0.689	8.529	6.271	26.29	54.14	3600	0.018	1.726	0.226	1.038	118.4	.	.	.	.
AC-1	0.486	0.653	3.483	85.42	0.055	11.17	4.617	10.57	86.67	403.5	0.036	0.64	0.014	0.242	106.9	.	.	.	.
AC-2	0.514	0.666	3.614	78.56	0.045	9.343	5.029	9.514	94.87	419.3	0.034	0.559	0.014	0.241	113	.	.	.	.
ACS	0.251	0.42	1.698	25.6	0.25	3.72	1.636	8.54	56.4	162	0.107	0.242	0.26	0.113	36.6	0.001	.	.	.
AC-3	0.426	0.192	1.537	43.27	0.421	4.494	2.343	6.888	36.15	245.9	0.117	0.388	0.31	0.21	42.14	.	174	.	2.63
P-1FW	0.228	0.42	2.633	68	0.011	5.383	4.033	7.2	28	411.7	0.011	0.383	0.015	0.393	46.5	.	.	.	.
P-1W	0.506	0.536	2.456	98.43	0.212	5.538	3.1	12.18	38.81	513.4	0.158	0.464	0.391	0.213	65.18	2E-04	177	.	3.995
P-1E	0.985	0.71	1.808	67.41	0.277	5.171	2.751	7.252	29.28	384.3	0.132	0.391	0.275	0.177	48.53	1E-04	192.4	.	7.795
WC	0.191	0.36	1.75	37.67	0.009	2.917	2.633	4.317	18.33	320	0.004	0.213	0.013	0.576	41.67	.	.	.	.
P-2W	0.398	.	1.166	88.48	0.245	4.425	3.213	9.194	18.17	433.6	0.058	0.505	0.544	0.339	38.25	.	.	.	.
P-2E	0.32	.	1.7	51.1	0.32	3.2	2.5	10.4	9.9	239	0.065	0.32	0.65	0.65	30.9	.	.	.	.
P-3W	0.316	0.55	1.158	60.83	0.223	3.429	2.402	8.564	11.92	323.7	0.048	0.434	0.428	0.442	30	.	.	.	.
P-3E	0.264	0.5	3.45	161	0.136	6.275	4.85	10.1	21.5	775	0.04	0.805	0.029	0.155	42.5	.	.	.	.
P-4W	1.225	.	1.863	71.18	0.242	6.313	2.96	7.25	14.86	329	0.042	0.128	0.38	0.488	45.73	.	233.4	.	4.342
P-4E	0.517	0.642	2.274	112.4	0.127	5.677	3.552	7.154	17.06	630.9	0.033	0.515	0.089	0.782	54.62	.	567.6	.	3.3
?	0.65	.	1.1	141	0.25	7.3	5.8	10.5	24.7	659	0.06	0.34	.	1.3	44.3	.	.	.	.

SubReach	Distance from Rio Grande	Cyanide__Total	Americium_241_GS	Plutonium_239	Aroclor_1254	Aroclor_1260	Chlordane_alpha_	Chlordane_gamma_	DDE_4_4__	DDT_4_4__	Endrin_Aldehyde	Acenaphthene	Anthracene	Benzo_a_anthracene	Benzo_b_fluoranthene	Bis_2_ethylhexyl_phthalate	Chrysene	Indeno_1_2_3_cd_pyrene	Naphthalene	Phenanthrene	Pyrene
DP-1W	16.4	.	0.34	0.068	0.41	0.41	0.25	0.18	0.041	0.12	0.041	2.05	2.05	3	3.8	2.05	3.3	3.8	2.05	3.2	12
DP-1C	16.3	.	0.15	0.044	0.175	1	.	.	.	.	.	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.7	5.5
DP-1E	15.5	.	0.4	0.075	0.195	0.195	0.017	0.012	0.02	0.021	0.02	2.1	2.1	1.95	1.95	2.1	1.95	2.1	2.1	1.8	2.9
DP-2	14.7	.	29.8	11.11	0.095	0.175	0.031	0.034	0.01	0.119	0.01	1	1	0.77	1	1	0.83	1	1	0.79	2.5
DP-3	13.8	.	71	11.2	0.08	0.091	0.011	0.009	0.008	0.056	0.008	2.05	2.05	2.05	1.3	2.05	2.05	2.05	2.05	2.05	1.6
DP-4	13.1	0.15	32.7	48.3	0.075	0.075	0.024	0.017	0.008	0.045	0.008	2	2	2	2	2	2	2	2	2	2
LA-0	19.5	.	.	.	0.021	0.087	0.001	0.002	0.023	0.061	0.002	1	1	1	1	1	1	1	1	1	1.15
LA-1FW	18.4	.	.	0.03	0.022	0.14	0.004	0.005	0.007	0.022	0.002	1.05	1.05	1.05	1.05	1.05	2.3	1.05	1.05	1.05	1.15
LA-1W+	17.5	.	.	0.623	1.5	0.18	0.001	0.001	0.006	0.026	0.002	0.235	0.235	0.21	0.25	1.2	0.29	0.195	0.235	0.27	0.95
LA-1W	17.2	.	.	19.1	1.3	0.185	0.007	0.007	0.002	0.017	0.002	0.215	0.215	0.215	0.215	0.185	0.195	0.215	0.215	0.2	1.05
LA-1C	15.7	.	0.118	8.78	1.3	1	0.006	0.021	0.009	0.14	0.057	1.7	1.7	1.1	0.85	1.7	0.85	1.1	1.7	1.1	1.3
LA-1E	14.8	.	.	19.3	0.195	1	0.001	0.006	0.01	0.017	0.01	0.245	0.245	0.32	0.215	0.53	0.28	0.215	0.245	1.2	1.05
LA-2W	13.0	0.15	0.29	10.62	0.085	0.59	0.1	0.1	0.1	0.1	0.1	0.235	0.235	0.27	0.26	0.4	0.29	0.195	0.235	0.44	0.95
LA-2E	12.6	0.15	28	6.39	0.024	0.23	9E-04	9E-04	0.002	0.002	0.002	0.26	0.069	0.368	0.66	0.229	0.41	0.341	0.178	0.33	0.589
LA-2FE	11.2	.	18.3	15.5	0.02	0.58	0.023	0.02	0.027	0.087	0.006	0.21	0.21	0.29	0.23	0.21	0.32	0.2	0.21	0.59	0.9
LA-3W	10.5	.	4.73	2.73	0.024	0.34	0.006	0.006	0.006	0.075	0.006	0.235	0.23	0.23	0.28	0.27	0.32	0.28	0.235	0.29	1.05
LA-3	9.3	0.135	11.8	3.18	0.037	0.24	0.003	0.007	0.014	0.029	0.004	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.05
LA-3E	8.8	2.5	1	1.28	.	.	.	.	.	.	.	0.3	0.3	0.3	0.33	0.3	0.3	0.3	0.3	0.46	0.58
LA-4W	6.0	.	4.64	13.8	0.021	0.021	0.001	0.001	0.002	0.005	0.002	.	.	.	.	.	.	.	.	.	.
LA-4E	5.0	.	0.602	6.02	0.025	0.025	0.001	0.001	0.003	0.003	0.003	.	.	.	.	.	.	.	.	.	.
LA-4FE	4.3	.	0.21	1.51	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LA-5	0.9	0.5	0.12	4.54	0.007	0.007	3E-04	3E-04	3E-04	3E-04	3E-04	0.335	0.335	0.335	0.335	0.09	0.335	0.335	0.335	0.335	0.335
LA-5E	0.1	2	0.07	1.59	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Baseline	20.0	.	0.235	0.7	.	.	.	.	.	.	.	0.41	0.41	0.41	0.41	0.41	0.41	0.41	1.5	0.98	0.41
AC-1	19.1	.	0.9	0.123	0.09	0.13	0.031	0.034	0.03	0.08	0.009	1.6	3	5.6	6.7	2	5.3	2.1	2.4	11	11
AC-2	18.8	.	0.31	1.25	0.075	0.075	0.012	0.026	0.009	0.039	0.008	0.9	1.1	2.6	5.3	1.7	3.1	1.2	0.9	5.1	5.9
ACS	18.6	.	1.43	149	0.19	0.043	0.009	0.009	0.028	0.13	0.009	1	1	1	1	1	1	1	1	1	1
AC-3	18.3	0.5	88	477	6.2	0.7	0.018	0.018	0.037	0.1	0.037	0.53	0.72	1.8	2.9	0.385	1.6	0.62	0.81	3.5	3.2
P-1FW	18.5	.	.	.	0.057	0.076	0.003	0.004	0.004	0.026	0.002	0.235	0.235	0.235	0.235	0.34	0.235	0.235	0.235	0.235	0.235
P-1W	18.3	0.55	0.364	0.421	0.024	0.11	0.012	0.012	0.004	0.016	0.002	0.24	0.24	0.42	0.6	1.4	0.39	0.24	0.24	0.8	1.1
P-1E	17.8	0.5	4.57	502	0.238	0.117	0.005	3E-04	3E-04	0.005	3E-04	0.17	0.3	1	2.5	0.305	1.2	0.88	0.2	1.2	2.2
WC	17.8	.	.	.	0.018	0.018	9E-04	9E-04	0.003	0.005	0.002	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175	0.175
P-2W	14.6	.	1.291	73.4	0.02	0.055	0.001	0.001	0.002	0.002	0.002	.	.	.	.	.	.	.	.	.	.
P-2E	13.3	.	0.972	44.9	0.022	0.022	0.001	0.001	0.002	0.002	0.002	.	.	.	.	.	.	.	.	.	.
P-3W	11.4	.	0.452	11.7	0.023	0.041	0.001	0.001	0.002	0.002	0.002	.	.	.	.	.	.	.	.	.	.
P-3E	10.4	.	0.11	7.93	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
P-4W	9.5	1	2.077	170.5	0.016	0.016	8E-04	8E-04	0.002	0.002	0.002	0.219	0.369	0.609	0.91	0.172	0.6	0.455	0.374	1.505	1.055
P-4E	8.6	0.52	0.39	18.65	0.017	0.017	9E-04	9E-04	0.002	0.002	0.002	0.172	0.172	0.172	0.172	0.172	0.172	0.172	0.172	0.172	0.172
?	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

SubReach	Antimony	Antimony - detects	Arsenic	Barium	Cadmium	Chromium__Total	Cobalt	Copper	Lead	Manganese	Mercury	Selenium	Silver	Thallium	Zinc	Methylmercury_1_Ion	Titanium	Total_Uranium_by_ICPMS	Uranium
DP-1W	1.2	1.2	3	135	0.4	14.8	3.9	15	207	321	0.12	1.1	0.1	0.38	166	.	.	.	.
DP-1C	1	1	3.7	119	0.67	26.7	7.2	14.8	205	1100	0.25	0.75	2	0.57	106	.	.	.	.
DP-1E	1.1	1.1	3	88.3	0.4	20.4	3.7	13.6	189	312	0.06	0.73	0.184	0.385	106	.	.	.	.
DP-2	3.95	1.4	3	112	0.345	9.8	4.71	14.4	76.5	738	0.09	1.3	0.95	0.44	71.6	.	.	.	.
DP-3	1.1	1.1	2.6	86.5	0.402	18.3	4.8	8	80.1	343	0.07	0.71	0.24	0.39	53	.	.	.	.
DP-4	2.45	.	2.6	126	0.1	5.9	3	36.1	57.7	309	0.05	0.32	0.145	0.315	53.5	.	88.8	.	6.8
LA-0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LA-1FW	0.225	.	1.6	58.5	0.015	3.5	2.2	13.5	39.3	210	0.01	0.38	0.045	0.17	35.5	.	.	.	.
LA-1W+	0.23	.	1.8	76.8	0.015	6.5	2.9	9.3	41.2	264	0.09	0.5	0.045	0.175	47.5	.	.	.	.
LA-1W	4.6	.	2.2	73	0.4	5	3.7	13.1	43.7	299	0.16	0.445	1.7	0.18	54.5	.	.	.	.
LA-1C	4.05	3.15	3.4	128	0.63	61	3.7	17	110	340	3.4	0.612	1.8	0.218	390	.	.	7.1	.
LA-1E	4.3	.	2.4	123	0.37	10.6	4	23.8	30	300	0.1	0.55	1.4	0.175	52.3	.	.	.	.
LA-2W	6	.	2.7	82.6	0.3	19.5	3.4	12.5	46.9	313	0.31	0.6	15.8	0.48	81.7	.	223	.	6.9
LA-2E	7	.	2.7	73	0.89	18.9	2.3	9.3	51	357	0.07	0.7	1.35	0.205	72.8	.	409	.	6.4
LA-2FE	0.82	0.82	3.1	100	0.3	15	3.8	12	49	380	0.15	0.62	0.16	0.115	58	.	.	.	.
LA-3W	0.6	0.6	2.2	76	0.16	11	2.7	7.8	33	300	0.094	0.42	0.044	0.14	52	.	.	.	.
LA-3	3.25	.	1.8	84	0.27	12.2	3.6	15.4	44.2	302	0.14	0.15	0.95	0.095	51.6	.	.	.	6.48
LA-3E	0.69	0.69	5	370	0.59	11	8.1	26	53	2100	0.094	1.7	0.14	0.7	140	.	.	.	.
LA-4W	2.65	.	2.2	76.9	0.265	4.7	3.2	10	31.6	283	0.04	0.315	0.64	0.315	35.6	.	.	.	.
LA-4E	2.45	.	2.9	104	0.245	5.3	4.4	10.8	13.2	364	0.035	0.415	0.245	0.44	31.6	.	.	.	.
LA-4FE	0.67	0.67	3.4	230	0.078	9	6.3	16	31	1000	0.069	0.49	0.65	0.27	87	.	.	.	.
LA-5	2.55	.	0.9	102	0.255	9.4	3.4	5.9	26.2	256	0.06	0.4	0.255	0.2	38.4	.	394	.	5.4
LA-5E	0.55	0.55	3.8	290	0.57	5.9	5.6	15	30	1100	0.029	1.3	0.094	0.335	57	.	.	.	.
Baseline	0.68	0.68	6.6	1300	0.96	11	8.9	45	75	8200	0.04	4.7	0.64	2.05	180	.	.	.	.
AC-1	0.94	0.94	4.1	129	0.15	19	6.2	14.9	130	540	0.061	0.91	0.015	0.53	190	.	.	.	.
AC-2	0.84	0.84	5.1	100	0.18	15	8.6	16	170	620	0.081	0.87	0.015	0.69	170	.	.	.	.
ACS	0.43	0.43	2.4	39	0.67	7.6	2.1	12	130	200	0.29	0.51	1.2	0.19	60	0.002	.	.	.
AC-3	2.5	0.56	3.3	99	3.3	9.7	5.2	27	78	460	0.75	1.1	2.1	0.66	94	.	240	.	2.8
P-1FW	0.42	0.42	3.9	100	0.013	8.7	4.6	10	68	700	0.037	0.65	0.017	1	71	.	.	.	.
P-1W	2.65	0.81	4.3	280	0.54	9.4	5.9	21	66	1500	0.49	1.4	1.7	0.53	110	2E-04	236	.	4.09
P-1E	2.55	0.71	3.3	130	0.92	12.9	4.9	15.1	77.3	820	0.65	0.84	1.6	0.295	113	2E-04	368	.	41
WC	0.36	0.36	2.1	52	0.01	4.2	4	6.9	24	380	0.008	0.36	0.014	1.2	56	.	.	.	.
P-2W	0.65	.	2.6	248	0.44	7.8	6.4	31.5	33.9	1140	0.15	0.98	0.6	0.6	54.1	.	.	.	.
P-2E	0.32	.	1.7	51.1	0.32	3.2	2.5	10.4	9.9	239	0.065	0.32	0.65	0.65	30.9	.	.	.	.
P-3W	0.65	0.55	2.6	150	0.345	7.3	5.3	20.5	23.1	681	0.07	0.84	0.7	0.7	45.9	.	.	.	.
P-3E	0.5	0.5	4.3	220	0.25	8	5.9	13	27	1000	0.055	1.2	0.032	0.175	50	.	.	.	.
P-4W	2.2	.	5.1	163	0.52	14.5	5.6	12.8	30.5	484	0.11	0.25	1	1.1	66.9	.	454	.	5.9
P-4E	1.2	1.2	5.4	270	0.41	9.4	7.7	17	36	1300	0.096	1.5	0.42	6.7	222	.	1840	.	5.5
?	0.65	.	1.1	141	0.25	7.3	5.8	10.5	24.7	659	0.06	0.34	.	1.3	44.3	.	.	.	.

SubReach	Distance from Rio Grande	Cyanide__Total HQ	Americium_241_GS HQ	Plutonium_239 HQ	Aroclor_1254 HQ	Aroclor_1260 HQ	DDE_4_4_HQ	DDT_4_4_HQ	Endrin_Aldehyde HQ	Acenaphthene HQ	Bis_2_ethylhexyl_phthalate HQ	Chrysene HQ	Naphthalene HQ	Antimony HQ	Antimony - detects HQ	Arsenic HQ	Barium HQ	Cadmium HQ	Chromium__Total HQ	Cobalt HQ	Copper HQ	Lead HQ	Manganese HQ	Mercury HQ	Selenium HQ	Silver HQ	Thallium HQ	Zinc HQ	Methylmercury__1__Ion HQ	Titanium HQ	Total_Uranium_by_ICPMS HQ	Uranium HQ	HI -all	HI - w/o Ba,Co,Mn
ESL		n/a	21000	160000	10	n/a	n/a	3.7	0.0034	0.25	n/a	n/a	n/a	0.05	0.05	10	100	1	2.4	0.25	10	450	50	34	0.1	0.05	0.1	10	n/a	n/a	25	25		
DP-1W	16.4	n/a	0.00	0.00	0.03	n/a	n/a	0.02	9.90	7.57	n/a	n/a	n/a	11.03	18.27	0.17	0.66	0.19	3.61	10.97	1.05	0.16	3.68	0.00	4.46	1.73	3.30	8.55	n/a	n/a	nd	nd	85	52
DP-1C	16.3	n/a	0.00	0.00	0.00	n/a	n/a	nd	nd	3.34	n/a	n/a	n/a	7.14	14.47	0.19	0.56	0.12	3.51	10.77	0.83	0.12	5.07	0.00	2.30	8.02	2.13	5.82	n/a	n/a	nd	nd	64	34
DP-1E	15.5	n/a	0.00	0.00	0.01	n/a	n/a	0.01	5.74	5.03	n/a	n/a	n/a	10.17	20.80	0.22	0.56	0.21	4.66	10.01	0.88	0.21	4.87	0.00	3.38	2.04	3.22	7.03	n/a	n/a	nd	nd	79	43
DP-2	14.7	n/a	0.00	0.00	0.00	n/a	n/a	0.01	1.67	1.80	n/a	n/a	n/a	34.67	20.60	0.20	0.65	0.17	2.32	12.88	0.83	0.09	5.99	0.00	4.03	7.03	2.62	5.27	n/a	n/a	nd	nd	101	61
DP-3	13.8	n/a	0.00	0.00	0.00	n/a	n/a	0.00	1.52	3.27	n/a	n/a	n/a	8.33	22.00	0.16	0.49	0.12	2.60	10.36	0.46	0.08	3.84	0.00	3.37	2.65	3.29	3.61	n/a	n/a	nd	nd	66	29
DP-4	13.1	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.93	4.56	n/a	n/a	n/a	11.26	nd	0.18	0.50	0.05	1.73	8.81	1.23	0.07	4.64	0.00	2.83	2.45	2.46	4.13	n/a	n/a	nd	0.27	46	32
LA-0	19.5	n/a	nd	nd	0.00	n/a	n/a	0.01	0.56	2.54	n/a	n/a	n/a	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	n/a	n/a	nd	nd	3	3
LA-1FW	18.4	n/a	nd	0.00	0.00	n/a	n/a	0.00	0.56	2.50	n/a	n/a	n/a	4.20	nd	0.13	0.36	0.01	1.05	6.77	0.88	0.05	3.51	0.00	3.33	0.87	1.58	2.66	n/a	n/a	nd	nd	28	18
LA-1W+	17.5	n/a	nd	0.00	0.04	n/a	n/a	0.00	0.58	0.79	n/a	n/a	n/a	4.02	nd	0.15	0.53	0.01	1.87	8.57	0.77	0.07	4.00	0.00	3.09	0.84	1.54	3.42	n/a	n/a	nd	nd	30	17
LA-1W	17.2	n/a	nd	0.00	0.04	n/a	n/a	0.00	0.60	0.79	n/a	n/a	n/a	56.58	nd	0.15	0.64	0.24	1.85	11.70	0.88	0.08	5.08	0.00	3.02	14.78	1.29	4.27	n/a	n/a	nd	nd	102	85
LA-1C	15.7	n/a	0.00	0.00	0.02	n/a	n/a	0.02	4.85	1.59	n/a	n/a	n/a	45.87	36.26	0.20	0.45	0.14	4.07	7.68	0.65	0.04	4.04	0.01	2.99	18.74	0.87	5.90	n/a	n/a	0.05	nd	134	86
LA-1E	14.8	n/a	nd	0.00	0.00	n/a	n/a	0.00	0.91	0.82	n/a	n/a	n/a	43.35	nd	0.14	0.85	0.19	2.64	11.20	1.31	0.04	4.92	0.00	3.56	11.97	1.35	3.58	n/a	n/a	nd	nd	87	70
LA-2W	13.0	n/a	0.00	0.00	0.00	n/a	n/a	0.01	10.72	0.79	n/a	n/a	n/a	45.32	nd	0.21	0.60	0.12	4.20	8.96	0.77	0.06	5.33	0.00	3.73	68.58	2.59	5.44	n/a	n/a	nd	0.19	158	143
LA-2E	12.6	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.47	0.73	n/a	n/a	n/a	64.17	nd	0.16	0.53	0.23	3.54	7.60	0.59	0.07	5.51	0.00	3.00	5.33	1.63	5.95	n/a	n/a	nd	0.21	100	86
LA-2FE	11.2	n/a	0.00	0.00	0.00	n/a	n/a	0.01	1.26	0.70	n/a	n/a	n/a	9.70	9.70	0.21	0.63	0.15	3.44	10.07	0.70	0.06	5.50	0.00	4.35	1.37	1.06	4.02	n/a	n/a	nd	nd	53	27
LA-3W	10.5	n/a	0.00	0.00	0.00	n/a	n/a	0.01	1.60	0.84	n/a	n/a	n/a	6.95	9.05	0.18	0.54	0.09	2.57	8.87	0.64	0.05	4.80	0.00	2.18	0.75	1.18	4.18	n/a	n/a	nd	nd	44	21
LA-3	9.3	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.30	1.65	n/a	n/a	n/a	59.00	nd	0.12	0.53	0.24	2.73	10.30	0.79	0.06	5.02	0.00	1.33	17.38	0.84	4.22	n/a	n/a	nd	0.17	105	89
LA-3E	8.8	n/a	0.00	0.00	nd	n/a	n/a	nd	nd	1.02	n/a	n/a	n/a	7.53	12.80	0.32	2.77	0.47	3.88	26.20	1.91	0.09	29.75	0.00	12.20	1.65	4.49	11.09	n/a	n/a	nd	nd	116	45
LA-4W	6.0	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.60	nd	n/a	n/a	n/a	41.44	nd	0.10	0.53	0.21	1.53	8.88	0.81	0.05	4.04	0.00	1.62	6.54	1.62	2.60	n/a	n/a	nd	nd	71	57
LA-4E	5.0	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.59	nd	n/a	n/a	n/a	24.59	nd	0.13	0.53	0.11	1.15	9.05	0.55	0.02	4.36	0.00	2.31	2.97	2.55	2.13	n/a	n/a	nd	nd	51	37
LA-4FE	4.3	n/a	0.00	0.00	nd	n/a	n/a	nd	nd	nd	n/a	n/a	n/a	7.69	10.24	0.22	1.27	0.02	2.79	18.65	1.11	0.04	10.70	0.00	2.34	3.24	1.99	5.29	n/a	n/a	nd	nd	66	25
LA-5	0.9	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.10	0.76	n/a	n/a	n/a	49.29	8.88	0.06	0.67	0.17	1.98	8.72	0.41	0.02	3.62	0.00	2.26	2.96	1.50	2.16	n/a	n/a	nd	0.14	84	62
LA-5E	0.1	n/a	0.00	0.00	nd	n/a	n/a	nd	nd	nd	n/a	n/a	n/a	7.95	nd	0.23	1.48	0.21	1.83	15.63	0.84	0.04	12.57	0.00	5.90	0.80	2.55	3.41	n/a	n/a	nd	nd	53	24
Baseline	20.0	n/a	0.00	0.00	nd	n/a	n/a	nd	nd	1.24	n/a	n/a	n/a	9.79	11.36	0.48	6.49	0.69	3.55	25.09	2.63	0.12	72.00	0.00	17.26	4.52	10.38	11.84	n/a	n/a	nd	nd	177	62
AC-1	19.1	n/a	0.00	0.00	0.01	n/a	n/a	0.01	2.40	2.32	n/a	n/a	n/a	9.72	13.05	0.35	0.85	0.05	4.65	18.47	1.06	0.19	8.07	0.00	6.40	0.28	2.42	10.69	n/a	n/a	nd	nd	81	41
AC-2	18.8	n/a	0.00	0.00	0.00	n/a	n/a	0.01	1.44	2.03	n/a	n/a	n/a	10.29	13.32	0.36	0.79	0.04	3.89	20.11	0.95	0.21	8.39	0.00	5.59	0.28	2.41	11.30	n/a	n/a	nd	nd	81	39
ACS	18.6	n/a	0.00	0.00	0.00	n/a	n/a	0.01	1.08	1.64	n/a	n/a	n/a	5.02	8.40	0.17	0.26	0.25	1.55	6.54	0.85	0.13	3.24	0.00	2.42	5.20	1.13	3.66	n/a	n/a	nd	nd	42	23
AC-3	18.3	n/a	0.00	0.00	0.10	n/a	n/a	0.01	2.36	0.96	n/a	n/a	n/a	8.53	3.85	0.15	0.43	0.42	1.87	9.37	0.69	0.08	4.92	0.00	3.88	6.20	2.10	4.21	n/a	n/a	nd	0.11	50	32
P-1FW	18.5	n/a	nd	nd	0.00	n/a	n/a	0.00	0.59	0.81	n/a	n/a	n/a	4.55	8.40	0.26	0.68	0.01	2.24	16.13	0.72	0.06	8.23	0.00	3.83	0.30	3.93	4.65	n/a	n/a	nd	nd	55	22
P-1W	18.3	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.51	0.70	n/a	n/a	n/a	10.13	10.72	0.25	0.98	0.21	2.31	12.40	1.22	0.09	10.27	0.00	4.64	7.82	2.13	6.52	n/a	n/a	nd	0.16	71	37
P-1E	17.8	n/a	0.00	0.00	0.01	n/a	n/a	0.00	0.10	0.64	n/a	n/a	n/a	19.69	14.20	0.18	0.67	0.28	2.15	11.00	0.73	0.07	7.69	0.00	3.91	5.50	1.77	4.85	n/a	n/a	nd	0.31	74	40
WC	17.8	n/a	nd	nd	0.00	n/a	n/a	0.00	0.50	0.68	n/a	n/a	n/a	3.82	7.20	0.18	0.38	0.01	1.22	10.53	0.43	0.04	6.40	0.00	2.13	0.25	5.76	4.17	n/a	n/a	nd	nd	44	19
P-2W	14.6	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.55	nd	n/a	n/a	n/a	7.96	nd	0.12	0.88	0.25	1.84	12.85	0.92	0.04	8.67	0.00	5.05	10.88	3.39	3.83	n/a	n/a	nd	nd	57	35
P-2E	13.3	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.63	nd	n/a	n/a	n/a	6.40	nd	0.17	0.51	0.32	1.33	10.00	1.04	0.02	4.78	0.00	3.20	13.00	6.50	3.09	n/a	n/a	nd	nd	51	36
P-3W	11.4	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.57	nd	n/a	n/a	n/a	6.31	11.00	0.12	0.61	0.22	1.43	9.61	0.86	0.03	6.47	0.00	4.34	8.55	4.42	3.00	n/a	n/a	nd	nd	58	30
P-3E	10.4	n/a	0.00	0.00	nd	n/a	n/a	nd	nd	nd	n/a	n/a	n/a	5.28	10.00	0.35	1.61	0.14	2.61	19.40	1.01	0.05	15.50	0.00	8.05	0.57	1.55	4.25	n/a	n/a	nd	nd	70	24
P-4W	9.5	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.44	0.73	n/a	n/a	n/a	24.50	nd	0.19	0.71	0.24	2.63	11.84	0.73	0.03	6.58	0.00	1.28	7.60	4.88	4.57	n/a	n/a	nd	0.17	67	48
P-4E	8.6	n/a	0.00	0.00	0.00	n/a	n/a	0.00	0.45	0.67	n/a	n/a	n/a	10.34	12.83	0.23	1.12	0.13	2.37	14.21	0.72	0.04	12.62	0.00	5.15	1.79	7.82	5.46	n/a	n/a	nd	0.13	76	35
?		n/a	nd	nd	nd	n/a	n/a	nd	nd	nd	n/a	n/a	n/a	13.00	nd	0.11	1.41	0.25	3.04	23.20	1.05	0.05	13.18	0.00	3.40	nd	13.00	4.43	n/a	n/a	nd	nd	76	38

SubReach	Distance from Rio Grande	Cyanide__Total HQ	Americium_241_GS HQ	Plutonium_239 HQ	Aroclor_1254 HQ	Aroclor_1260 HQ	DDE_4_4__HQ	DDT_4_4__HQ	Endrin_Aldehyde HQ	Acenaphthene HQ	Bis_2_ethylhexyl_phthalate HQ	Chrysene HQ	Naphthalene HQ	Antimony HQ	Antimony - detects HQ	Arsenic HQ	Barium HQ	Cadmium HQ	Chromium__Total HQ	Cobalt HQ	Copper HQ	Lead HQ	Manganese HQ	Mercury HQ	Selenium HQ	Silver HQ	Thallium HQ	Zinc HQ	Methylmercury__1__Ion HQ	Titanium HQ	Total_Uranium_by_ICPMS HQ	Uranium HQ	HI -all	HI - w/o Ba,Co,Mn
ESL		n/a	44	47	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6.8	n/a	0.1	1.4	n/a	13	2000	n/a	0.1	7.7	n/a	n/a	350	2.5	n/a	n/a	n/a		
DP-1W	16.4	n/a	0.00	0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.25	n/a	1.91	6.19	n/a	0.81	0.04	n/a	1.16	0.06	n/a	n/a	0.24	nd	n/a	n/a	n/a	11	11
DP-1C	16.3	n/a	0.00	0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.29	n/a	1.16	6.02	n/a	0.64	0.03	n/a	0.84	0.03	n/a	n/a	0.17	nd	n/a	n/a	n/a	9	9
DP-1E	15.5	n/a	0.00	0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.32	n/a	2.14	7.98	n/a	0.67	0.05	n/a	0.70	0.04	n/a	n/a	0.20	nd	n/a	n/a	n/a	12	12
DP-2	14.7	n/a	0.10	0.06	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.29	n/a	1.72	3.98	n/a	0.63	0.02	n/a	0.79	0.05	n/a	n/a	0.15	nd	n/a	n/a	n/a	8	8
DP-3	13.8	n/a	0.25	0.09	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.24	n/a	1.25	4.45	n/a	0.35	0.02	n/a	0.44	0.04	n/a	n/a	0.10	nd	n/a	n/a	n/a	7	7
DP-4	13.1	n/a	0.11	0.11	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.26	n/a	0.48	2.97	n/a	0.95	0.02	n/a	0.41	0.04	n/a	n/a	0.12	nd	n/a	n/a	n/a	5	5
LA-0	19.5	n/a	nd	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	nd	n/a	nd	nd	n/a	nd	nd	n/a	nd	nd	n/a	n/a	nd	nd	n/a	n/a	n/a	0	0
LA-1FW	18.4	n/a	nd	0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.19	n/a	0.12	1.80	n/a	0.67	0.01	n/a	0.13	0.04	n/a	n/a	0.08	nd	n/a	n/a	n/a	3	3
LA-1W+	17.5	n/a	nd	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.21	n/a	0.12	3.20	n/a	0.59	0.01	n/a	0.66	0.04	n/a	n/a	0.10	nd	n/a	n/a	n/a	5	5
LA-1W	17.2	n/a	nd	0.08	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.21	n/a	2.43	3.17	n/a	0.68	0.02	n/a	1.06	0.04	n/a	n/a	0.12	nd	n/a	n/a	n/a	8	8
LA-1C	15.7	n/a	0.00	0.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.30	n/a	1.42	6.97	n/a	0.50	0.01	n/a	4.81	0.04	n/a	n/a	0.17	nd	n/a	n/a	n/a	14	14
LA-1E	14.8	n/a	nd	0.06	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.21	n/a	1.90	4.52	n/a	1.01	0.01	n/a	1.33	0.05	n/a	n/a	0.10	nd	n/a	n/a	n/a	9	9
LA-2W	13.0	n/a	0.00	0.04	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.31	n/a	1.18	7.20	n/a	0.59	0.01	n/a	2.36	0.05	n/a	n/a	0.16	nd	n/a	n/a	n/a	12	12
LA-2E	12.6	n/a	0.13	0.04	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.24	n/a	2.32	6.07	n/a	0.46	0.01	n/a	0.57	0.04	n/a	n/a	0.17	nd	n/a	n/a	n/a	10	10
LA-2FE	11.2	n/a	0.03	0.04	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.31	n/a	1.53	5.89	n/a	0.54	0.01	n/a	1.26	0.06	n/a	n/a	0.11	nd	n/a	n/a	n/a	10	10
LA-3W	10.5	n/a	0.03	0.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.26	n/a	0.91	4.40	n/a	0.49	0.01	n/a	0.85	0.03	n/a	n/a	0.12	nd	n/a	n/a	n/a	7	7
LA-3	9.3	n/a	0.03	0.02	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.17	n/a	2.44	4.68	n/a	0.61	0.01	n/a	0.79	0.02	n/a	n/a	0.12	nd	n/a	n/a	n/a	9	9
LA-3E	8.8	n/a	0.01	0.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.46	n/a	4.68	6.64	n/a	1.47	0.02	n/a	1.56	0.16	n/a	n/a	0.32	nd	n/a	n/a	n/a	15	15
LA-4W	6.0	n/a	0.01	0.07	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.15	n/a	2.13	2.61	n/a	0.62	0.01	n/a	0.61	0.02	n/a	n/a	0.07	nd	n/a	n/a	n/a	6	6
LA-4E	5.0	n/a	0.00	0.02	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.19	n/a	1.12	1.96	n/a	0.43	0.00	n/a	0.30	0.03	n/a	n/a	0.06	nd	n/a	n/a	n/a	4	4
LA-4FE	4.3	n/a	0.00	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.32	n/a	0.22	4.79	n/a	0.85	0.01	n/a	0.42	0.03	n/a	n/a	0.15	nd	n/a	n/a	n/a	7	7
LA-5	0.9	n/a	0.00	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.09	n/a	1.73	3.40	n/a	0.32	0.00	n/a	0.40	0.03	n/a	n/a	0.06	nd	n/a	n/a	n/a	6	6
LA-5E	0.1	n/a	0.00	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.34	n/a	2.07	3.14	n/a	0.64	0.01	n/a	0.25	0.08	n/a	n/a	0.10	nd	n/a	n/a	n/a	7	7
Baseline	20.0	n/a	0.01	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.71	n/a	6.89	6.09	n/a	2.02	0.03	n/a	0.36	0.22	n/a	n/a	0.34	nd	n/a	n/a	n/a	17	17
AC-1	19.1	n/a	0.01	0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.51	n/a	0.55	7.98	n/a	0.81	0.04	n/a	0.72	0.08	n/a	n/a	0.31	nd	n/a	n/a	n/a	11	11
AC-2	18.8	n/a	0.00	0.01	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.53	n/a	0.45	6.67	n/a	0.73	0.05	n/a	0.68	0.07	n/a	n/a	0.32	nd	n/a	n/a	n/a	10	10
ACS	18.6	n/a	0.01	0.77	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.25	n/a	2.50	2.66	n/a	0.66	0.03	n/a	2.14	0.03	n/a	n/a	0.10	0.00	n/a	n/a	n/a	9	9
AC-3	18.3	n/a	0.32	1.34	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.23	n/a	4.21	3.21	n/a	0.53	0.02	n/a	2.34	0.05	n/a	n/a	0.12	nd	n/a	n/a	n/a	12	12
P-1FW	18.5	n/a	nd	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.39	n/a	0.11	3.85	n/a	0.55	0.01	n/a	0.23	0.05	n/a	n/a	0.13	nd	n/a	n/a	n/a	5	5
P-1W	18.3	n/a	0.00	0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.36	n/a	2.12	3.96	n/a	0.94	0.02	n/a	3.16	0.06	n/a	n/a	0.19	0.00	n/a	n/a	n/a	11	11
P-1E	17.8	n/a	0.01	0.78	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.27	n/a	2.77	3.69	n/a	0.56	0.01	n/a	2.64	0.05	n/a	n/a	0.14	0.00	n/a	n/a	n/a	11	11
WC	17.8	n/a	nd	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.26	n/a	0.09	2.08	n/a	0.33	0.01	n/a	0.08	0.03	n/a	n/a	0.12	nd	n/a	n/a	n/a	3	3
P-2W	14.6	n/a	0.01	0.21	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.17	n/a	2.45	3.16	n/a	0.71	0.01	n/a	1.15	0.07	n/a	n/a	0.11	nd	n/a	n/a	n/a	8	8
P-2E	13.3	n/a	0.02	0.07	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.25	n/a	3.20	2.29	n/a	0.80	0.00	n/a	1.30	0.04	n/a	n/a	0.09	nd	n/a	n/a	n/a	8	8
P-3W	11.4	n/a	0.00	0.04	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.17	n/a	2.23	2.45	n/a	0.66	0.01	n/a	0.97	0.06	n/a	n/a	0.09	nd	n/a	n/a	n/a	7	7
P-3E	10.4	n/a	0.00	0.03	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.51	n/a	1.36	4.48	n/a	0.78	0.01	n/a	0.79	0.10	n/a	n/a	0.12	nd	n/a	n/a	n/a	8	8
P-4W	9.5	n/a	0.02	0.20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.27	n/a	2.42	4.51	n/a	0.56	0.01	n/a	0.85	0.02	n/a	n/a	0.13	nd	n/a	n/a	n/a	9	9
P-4E	8.6	n/a	0.00	0.06	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.33	n/a	1.27	4.05	n/a	0.55	0.01	n/a	0.66	0.07	n/a	n/a	0.16	nd	n/a	n/a	n/a	7	7
?		n/a	nd	nd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.16	n/a	2.50	5.21	n/a	0.81	0.01	n/a	1.20	0.04	n/a	n/a	0.13	nd	n/a	n/a	n/a	10	10

SubReach	Distance from Rio Grande	Cyanide__Total HQ	Americium_241_GS HQ	Plutonium_239 HQ	Aroclor_1254 HQ	Aroclor_1260 HQ	DDE_4_4__HQ	DDT_4_4__HQ	Endrin_Aldehyde HQ	Acenaphthene HQ	Bis_2_ethylhexyl_phthalate HQ	Chrysene HQ	Naphthalene HQ	Antimony HQ	Antimony - detects HQ	Arsenic HQ
ESL		1.4	62000	160000	0.22	2.2	0.0074	0.0092	0.16	n/a	1.7	n/a	12	n/a	n/a	2400
DP-1W	16.4	nd	0.00	0.00	1.17	0.12	4.55	6.52	0.21	n/a	0.66	n/a	0.14	n/a	n/a	0.00
DP-1C	16.3	nd	0.00	0.00	0.17	0.06	nd	nd	nd	n/a	0.44	n/a	0.07	n/a	n/a	0.00
DP-1E	15.5	nd	0.00	0.00	0.24	0.03	2.64	2.18	0.12	n/a	0.46	n/a	0.11	n/a	n/a	0.00
DP-2	14.7	nd	0.00	0.00	0.17	0.04	0.77	4.34	0.04	n/a	0.29	n/a	0.03	n/a	n/a	0.00
DP-3	13.8	nd	0.00	0.00	0.21	0.02	0.70	1.63	0.03	n/a	0.54	n/a	0.07	n/a	n/a	0.00
DP-4	13.1	0.11	0.00	0.00	0.12	0.01	0.49	1.11	0.02	n/a	0.66	n/a	0.10	n/a	n/a	0.00
LA-0	19.5	nd	nd	nd	0.09	0.02	1.32	2.60	0.01	n/a	0.36	n/a	0.05	n/a	n/a	nd
LA-1FW	18.4	nd	nd	0.00	0.09	0.01	0.37	1.27	0.01	n/a	0.36	n/a	0.05	n/a	n/a	0.00
LA-1W+	17.5	nd	nd	0.00	1.69	0.04	0.36	1.21	0.01	n/a	0.26	n/a	0.02	n/a	n/a	0.00
LA-1W	17.2	nd	nd	0.00	1.74	0.02	0.28	0.76	0.01	n/a	0.07	n/a	0.01	n/a	n/a	0.00
LA-1C	15.7	nd	0.00	0.00	0.92	0.16	0.70	6.67	0.10	n/a	0.27	n/a	0.03	n/a	n/a	0.00
LA-1E	14.8	nd	nd	0.00	0.18	0.10	0.56	1.10	0.02	n/a	0.17	n/a	0.02	n/a	n/a	0.00
LA-2W	13.0	0.08	0.00	0.00	0.13	0.13	4.93	4.76	0.23	n/a	0.13	n/a	0.02	n/a	n/a	0.00
LA-2E	12.6	0.10	0.00	0.00	0.08	0.04	0.21	0.17	0.01	n/a	0.10	n/a	0.01	n/a	n/a	0.00
LA-2FE	11.2	nd	0.00	0.00	0.03	0.12	1.11	3.16	0.03	n/a	0.10	n/a	0.02	n/a	n/a	0.00
LA-3W	10.5	nd	0.00	0.00	0.10	0.07	0.73	2.44	0.03	n/a	0.13	n/a	0.02	n/a	n/a	0.00
LA-3	9.3	0.09	0.00	0.00	0.08	0.04	0.42	0.69	0.01	n/a	0.24	n/a	0.03	n/a	n/a	0.00
LA-3E	8.8	1.68	0.00	0.00	nd	nd	nd	nd	nd	n/a	0.15	n/a	0.02	n/a	n/a	0.00
LA-4W	6.0	nd	0.00	0.00	0.09	0.01	0.27	0.39	0.01	n/a	nd	n/a	nd	n/a	n/a	0.00
LA-4E	5.0	nd	0.00	0.00	0.09	0.01	0.27	0.22	0.01	n/a	nd	n/a	nd	n/a	n/a	0.00
LA-4FE	4.3	nd	0.00	0.00	nd	nd	nd	nd	nd	n/a	nd	n/a	nd	n/a	n/a	0.00
LA-5	0.9	0.22	0.00	0.00	0.03	0.00	0.05	0.04	0.00	n/a	0.04	n/a	0.02	n/a	n/a	0.00
LA-5E	0.1	0.99	0.00	0.00	nd	nd	nd	nd	nd	n/a	nd	n/a	nd	n/a	n/a	0.00
Baseline	20.0	nd	0.00	0.00	nd	nd	nd	nd	nd	n/a	0.18	n/a	0.08	n/a	n/a	0.00
AC-1	19.1	nd	0.00	0.00	0.23	0.03	2.02	5.76	0.05	n/a	0.30	n/a	0.06	n/a	n/a	0.00
AC-2	18.8	nd	0.00	0.00	0.15	0.02	0.92	3.26	0.03	n/a	0.37	n/a	0.04	n/a	n/a	0.00
ACS	18.6	nd	0.00	0.00	0.15	0.01	0.93	4.22	0.02	n/a	0.25	n/a	0.04	n/a	n/a	0.00
AC-3	18.3	0.21	0.00	0.00	4.49	0.07	1.37	3.27	0.05	n/a	0.12	n/a	0.02	n/a	n/a	0.00
P-1FW	18.5	nd	nd	nd	0.12	0.01	0.30	0.91	0.01	n/a	0.13	n/a	0.02	n/a	n/a	0.00
P-1W	18.3	0.22	0.00	0.00	0.08	0.04	0.33	1.13	0.01	n/a	0.26	n/a	0.01	n/a	n/a	0.00
P-1E	17.8	0.25	0.00	0.00	0.24	0.02	0.05	0.21	0.00	n/a	0.10	n/a	0.01	n/a	n/a	0.00
WC	17.8	nd	nd	nd	0.08	0.01	0.25	0.20	0.01	n/a	0.10	n/a	0.01	n/a	n/a	0.00
P-2W	14.6	nd	0.00	0.00	0.09	0.01	0.25	0.20	0.01	n/a	nd	n/a	nd	n/a	n/a	0.00
P-2E	13.3	nd	0.00	0.00	0.10	0.01	0.29	0.23	0.01	n/a	nd	n/a	nd	n/a	n/a	0.00
P-3W	11.4	nd	0.00	0.00	0.09	0.01	0.26	0.21	0.01	n/a	nd	n/a	nd	n/a	n/a	0.00
P-3E	10.4	nd	0.00	0.00	nd	nd	nd	nd	nd	n/a	nd	n/a	nd	n/a	n/a	0.00
P-4W	9.5	0.40	0.00	0.00	0.07	0.01	0.20	0.16	0.01	n/a	0.10	n/a	0.02	n/a	n/a	0.00
P-4E	8.6	0.16	0.00	0.00	0.07	0.01	0.21	0.17	0.01	n/a	0.10	n/a	0.01	n/a	n/a	0.00
?		nd	nd	nd	nd	nd	nd	nd	nd	n/a	nd	n/a	nd	n/a	n/a	0.00

SubReach	Barium HQ	Cadmium HQ	Chromium__Total HQ	Cobalt HQ	Copper HQ	Lead HQ	Manganese HQ	Mercury HQ	Selenium HQ	Silver HQ	Thallium HQ	Zinc HQ	Methylmercury__1_ _Ion HQ	Titanium HQ	Total_Uranium_by_ICPMS HQ	Uranium HQ	HI -all	HI - w/o Ba,Co,Mn	HI - PCB/pest
ESL	46000	660	13000	6	22000	2700	280000	73	140	2400	n/a	4900	0.008	n/a	3900	3900			
DP-1W	0.00	0.00	0.00	0.46	0.00	0.03	0.00	0.00	0.00	0.00	n/a	0.02	nd	n/a	nd	nd	14	13	13
DP-1C	0.00	0.00	0.00	0.45	0.00	0.02	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	1	1	0
DP-1E	0.00	0.00	0.00	0.42	0.00	0.04	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	6	6	5
DP-2	0.00	0.00	0.00	0.54	0.00	0.02	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	6	6	5
DP-3	0.00	0.00	0.00	0.43	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	4	3	3
DP-4	0.00	0.00	0.00	0.37	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	0.00	3	3	2
LA-0	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	n/a	nd	nd	n/a	nd	nd	4	4	4
LA-1FW	0.00	0.00	0.00	0.28	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	2	2	2
LA-1W+	0.00	0.00	0.00	0.36	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	4	4	3
LA-1W	0.00	0.00	0.00	0.49	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	3	3	3
LA-1C	0.00	0.00	0.00	0.32	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	0.00	nd	9	9	9
LA-1E	0.00	0.00	0.00	0.47	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	3	2	2
LA-2W	0.00	0.00	0.00	0.37	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	0.00	11	10	10
LA-2E	0.00	0.00	0.00	0.32	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	0.00	1	1	1
LA-2FE	0.00	0.00	0.00	0.42	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	5	5	4
LA-3W	0.00	0.00	0.00	0.37	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	4	4	3
LA-3	0.00	0.00	0.00	0.43	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	0.00	2	2	1
LA-3E	0.01	0.00	0.00	1.09	0.00	0.01	0.01	0.00	0.01	0.00	n/a	0.02	nd	n/a	nd	nd	3	2	0
LA-4W	0.00	0.00	0.00	0.37	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	1	1	1
LA-4E	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00	nd	n/a	nd	nd	1	1	1
LA-4FE	0.00	0.00	0.00	0.78	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	1	0	0
LA-5	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.00	nd	n/a	nd	0.00	1	0	0
LA-5E	0.00	0.00	0.00	0.65	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	2	1	0
Baseline	0.01	0.00	0.00	1.05	0.00	0.02	0.01	0.00	0.01	0.00	n/a	0.02	nd	n/a	nd	nd	1	0	0
AC-1	0.00	0.00	0.00	0.77	0.00	0.03	0.00	0.00	0.00	0.00	n/a	0.02	nd	n/a	nd	nd	9	9	8
AC-2	0.00	0.00	0.00	0.84	0.00	0.04	0.00	0.00	0.00	0.00	n/a	0.02	nd	n/a	nd	nd	6	5	4
ACS	0.00	0.00	0.00	0.27	0.00	0.02	0.00	0.00	0.00	0.00	n/a	0.01	0.13	n/a	nd	nd	6	6	5
AC-3	0.00	0.00	0.00	0.39	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	0.00	10	10	9
P-1FW	0.00	0.00	0.00	0.67	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	2	2	1
P-1W	0.00	0.00	0.00	0.52	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	0.02	n/a	nd	0.00	3	2	2
P-1E	0.00	0.00	0.00	0.46	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	0.02	n/a	nd	0.00	1	1	1
WC	0.00	0.00	0.00	0.44	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	1	1	1
P-2W	0.00	0.00	0.00	0.54	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	1	1	1
P-2E	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	1	1	1
P-3W	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	nd	1	1	1
P-3E	0.00	0.00	0.00	0.81	0.00	0.01	0.00	0.00	0.01	0.00	n/a	0.01	nd	n/a	nd	nd	1	0	0
P-4W	0.00	0.00	0.00	0.49	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	0.00	1	1	0
P-4E	0.00	0.00	0.00	0.59	0.00	0.01	0.00	0.00	0.00	0.00	n/a	0.01	nd	n/a	nd	0.00	1	1	0
?	0.00	0.00	0.00	0.97	0.00	0.01	0.00	0.00	0.00	nd	n/a	0.01	nd	n/a	nd	nd	1	0	0

SubReac	Distance from Rio Grande	Cyanide__Total HQ	Americium_241_GS HQ	Plutonium_239 HQ	Aroclor_1254 HQ	Aroclor_1260 HQ	DDE_4_4___HQ	DDT_4_4___HQ	Endrin_Aldehyde HQ	Acenaphthene HQ	Bis_2_ethylhexyl_phthalate HQ	Chrysene HQ	Naphthalene HQ	Antimony HQ	Antimony - detects HQ	Arsenic HQ	Barium HQ	Cadmium HQ	Chromium__Total HQ	Cobalt HQ	Copper HQ	Lead HQ	Manganese HQ	Mercury HQ	Selenium HQ	Silver HQ	Thallium HQ	Zinc HQ	Methylmercury__1_Ion HQ	Titanium HQ	Total_Uranium_by_ICPMS HQ	Uranium HQ	HI -all	HI - w/o Ba,Co,Mn	HI - PCB/pest
ESL		0.1	4000	2100	0.04	0.44	0.003	0.003	0.011	n/a	1	n/a	0.2	n/a	n/a	19	230	0.7	460	0.051	390	55	3800	3.7	1.1	14	n/a	97	0	n/a	20	20			
DP-1W	16.4	nd	0.00	0.00	6.27	0.58	12.95	23.08	3.06	n/a	1.13	n/a	8.51	n/a	n/a	0.09	0.29	0.27	0.02	53.78	0.03	1.34	0.05	0.02	0.41	0.01	n/a	0.88	nd	n/a	nd	nd	113	59	46
DP-1C	16.3	nd	0.00	0.00	0.92	0.29	nd	nd	nd	n/a	0.74	n/a	4.37	n/a	n/a	0.10	0.24	0.16	0.02	52.77	0.02	1.00	0.07	0.01	0.21	0.03	n/a	0.60	nd	n/a	nd	nd	62	8	1
DP-1E	15.5	nd	0.00	0.00	1.28	0.17	7.50	7.73	1.77	n/a	0.78	n/a	6.31	n/a	n/a	0.11	0.24	0.30	0.02	49.08	0.02	1.75	0.06	0.01	0.31	0.01	n/a	0.72	nd	n/a	nd	nd	78	29	18
DP-2	14.7	nd	0.00	0.00	0.90	0.18	2.18	15.35	0.52	n/a	0.49	n/a	2.06	n/a	n/a	0.10	0.28	0.24	0.01	63.15	0.02	0.74	0.08	0.01	0.37	0.03	n/a	0.54	nd	n/a	nd	nd	87	24	19
DP-3	13.8	nd	0.00	0.00	1.11	0.12	1.98	5.77	0.47	n/a	0.92	n/a	4.08	n/a	n/a	0.08	0.21	0.18	0.01	50.78	0.01	0.62	0.05	0.01	0.31	0.01	n/a	0.37	nd	n/a	nd	nd	67	16	9
DP-4	13.1	1.50	0.00	0.00	0.62	0.06	1.39	3.94	0.29	n/a	1.11	n/a	5.70	n/a	n/a	0.09	0.22	0.07	0.01	43.21	0.03	0.56	0.06	0.01	0.26	0.01	n/a	0.43	nd	n/a	nd	0.34	60	16	6
LA-0	19.5	nd	nd	nd	0.46	0.10	3.76	8.84	0.17	n/a	0.62	n/a	3.18	n/a	n/a	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	n/a	nd	nd	n/a	nd	nd	17	17	13
LA-1FW	18.4	nd	nd	0.00	0.46	0.07	1.06	4.50	0.17	n/a	0.61	n/a	3.12	n/a	n/a	0.07	0.16	0.02	0.01	33.20	0.02	0.40	0.05	0.00	0.30	0.00	n/a	0.27	nd	n/a	nd	nd	44	11	6
LA-1W+	17.5	nd	nd	0.00	9.07	0.22	1.04	4.29	0.18	n/a	0.45	n/a	0.99	n/a	n/a	0.08	0.23	0.02	0.01	42.00	0.02	0.54	0.05	0.01	0.28	0.00	n/a	0.35	nd	n/a	nd	nd	60	18	15
LA-1W	17.2	nd	nd	0.00	9.31	0.12	0.79	2.67	0.19	n/a	0.12	n/a	0.83	n/a	n/a	0.08	0.28	0.34	0.01	57.35	0.02	0.64	0.07	0.01	0.27	0.05	n/a	0.44	nd	n/a	nd	nd	74	16	13
LA-1C	15.7	nd	0.00	0.00	4.96	0.80	1.98	23.59	1.50	n/a	0.46	n/a	2.00	n/a	n/a	0.11	0.20	0.20	0.02	37.63	0.02	0.31	0.05	0.06	0.27	0.07	n/a	0.61	nd	n/a	0.06	nd	75	37	33
LA-1E	14.8	nd	nd	0.00	0.96	0.49	1.60	3.91	0.28	n/a	0.30	n/a	1.03	n/a	n/a	0.07	0.37	0.27	0.01	54.90	0.03	0.36	0.06	0.02	0.32	0.04	n/a	0.37	nd	n/a	nd	nd	65	10	7
LA-2W	13.0	1.13	0.00	0.00	0.72	0.64	14.02	16.83	3.31	n/a	0.23	n/a	0.97	n/a	n/a	0.11	0.26	0.17	0.02	43.92	0.02	0.49	0.07	0.03	0.34	0.24	n/a	0.56	nd	n/a	nd	0.24	84	40	36
LA-2E	12.6	1.35	0.00	0.00	0.42	0.18	0.61	0.61	0.14	n/a	0.18	n/a	0.79	n/a	n/a	0.09	0.23	0.33	0.02	37.25	0.02	0.54	0.07	0.01	0.27	0.02	n/a	0.61	nd	n/a	nd	0.26	44	6	2
LA-2FE	11.2	nd	0.00	0.00	0.17	0.60	3.17	11.18	0.39	n/a	0.18	n/a	0.96	n/a	n/a	0.11	0.28	0.22	0.02	49.35	0.02	0.48	0.07	0.02	0.40	0.00	n/a	0.41	nd	n/a	nd	nd	68	18	16
LA-3W	10.5	nd	0.00	0.00	0.51	0.33	2.09	8.63	0.49	n/a	0.22	n/a	1.05	n/a	n/a	0.09	0.23	0.13	0.01	43.46	0.02	0.45	0.06	0.01	0.20	0.00	n/a	0.43	nd	n/a	nd	nd	58	15	12
LA-3	9.3	1.31	0.00	0.00	0.44	0.18	1.20	2.45	0.09	n/a	0.41	n/a	2.07	n/a	n/a	0.06	0.23	0.34	0.01	50.49	0.02	0.47	0.07	0.01	0.12	0.06	n/a	0.43	nd	n/a	nd	0.21	61	10	4
LA-3E	8.8	23.50	0.00	0.00	nd	nd	nd	nd	nd	n/a	0.26	n/a	1.38	n/a	n/a	0.17	1.20	0.66	0.02	128.43	0.05	0.72	0.39	0.02	1.11	0.01	n/a	1.14	nd	n/a	nd	nd	159	29	0
LA-4W	6.0	nd	0.00	0.00	0.49	0.05	0.78	1.37	0.18	n/a	nd	n/a	nd	n/a	n/a	0.06	0.23	0.30	0.01	43.53	0.02	0.40	0.05	0.01	0.15	0.02	n/a	0.27	nd	n/a	nd	nd	48	4	3
LA-4E	5.0	nd	0.00	0.00	0.49	0.05	0.78	0.78	0.18	n/a	nd	n/a	nd	n/a	n/a	0.07	0.23	0.16	0.01	44.37	0.01	0.14	0.06	0.00	0.21	0.01	n/a	0.22	nd	n/a	nd	nd	48	3	2
LA-4FE	4.3	nd	0.00	0.00	nd	nd	nd	nd	nd	n/a	nd	n/a	nd	n/a	n/a	0.12	0.55	0.03	0.01	91.42	0.03	0.32	0.14	0.01	0.21	0.01	n/a	0.55	nd	n/a	nd	nd	93	1	0
LA-5	0.9	3.09	0.00	0.00	0.16	0.02	0.13	0.13	0.03	n/a	0.06	n/a	0.95	n/a	n/a	0.03	0.29	0.24	0.01	42.76	0.01	0.16	0.05	0.01	0.21	0.01	n/a	0.22	nd	n/a	nd	0.18	49	6	0
LA-5E	0.1	13.82	0.00	0.00	nd	nd	nd	nd	nd	n/a	nd	n/a	nd	n/a	n/a	0.12	0.64	0.29	0.01	76.63	0.02	0.32	0.17	0.00	0.54	0.00	n/a	0.35	nd	n/a	nd	nd	93	15	0
Baseline	20.0	nd	0.00	0.00	nd	nd	nd	nd	nd	n/a	0.31	n/a	5.09	n/a	n/a	0.25	2.82	0.97	0.02	122.97	0.07	0.98	0.95	0.00	1.57	0.02	n/a	1.22	nd	n/a	nd	nd	137	11	0
AC-1	19.1	nd	0.00	0.00	1.25	0.16	5.76	20.38	0.74	n/a	0.51	n/a	3.71	n/a	n/a	0.18	0.37	0.08	0.02	90.52	0.03	1.58	0.11	0.01	0.58	0.00	n/a	1.10	nd	n/a	nd	nd	127	36	28
AC-2	18.8	nd	0.00	0.00	0.80	0.11	2.61	11.54	0.45	n/a	0.63	n/a	2.43	n/a	n/a	0.19	0.34	0.06	0.02	98.60	0.02	1.72	0.11	0.01	0.51	0.00	n/a	1.16	nd	n/a	nd	nd	121	22	16
ACS	18.6	nd	0.00	0.02	0.83	0.04	2.66	14.94	0.33	n/a	0.43	n/a	2.12	n/a	n/a	0.09	0.11	0.35	0.01	32.08	0.02	1.03	0.04	0.03	0.22	0.02	n/a	0.38	2.87	n/a	nd	nd	59	26	19
AC-3	18.3	2.88	0.00	0.03	24.09	0.34	3.89	11.56	0.73	n/a	0.21	n/a	1.43	n/a	n/a	0.08	0.19	0.59	0.01	45.94	0.02	0.66	0.06	0.03	0.35	0.02	n/a	0.43	nd	n/a	nd	0.13	94	47	41
P-1FW	18.5	nd	nd	nd	0.62	0.07	0.86	3.21	0.18	n/a	0.22	n/a	1.01	n/a	n/a	0.14	0.30	0.02	0.01	79.08	0.02	0.51	0.11	0.00	0.35	0.00	n/a	0.48	nd	n/a	nd	nd	87	8	5
P-1W	18.3	3.13	0.00	0.00	0.43	0.18	0.93	4.02	0.16	n/a	0.45	n/a	0.82	n/a	n/a	0.13	0.43	0.30	0.01	60.78	0.03	0.71	0.14	0.04	0.42	0.03	n/a	0.67	0.48	n/a	nd	0.20	74	13	6
P-1E	17.8	3.51	0.00	0.02	1.29	0.11	0.13	0.76	0.03	n/a	0.16	n/a	0.81	n/a	n/a	0.10	0.29	0.39	0.01	53.94	0.02	0.53	0.10	0.04	0.36	0.02	n/a	0.50	0.43	n/a	nd	0.39	64	10	2
WC	17.8	nd	nd	nd	0.42	0.04	0.71	0.70	0.16	n/a	0.17	n/a	0.85	n/a	n/a	0.09	0.16	0.01	0.01	51.63	0.01	0.33	0.08	0.00	0.19	0.00	n/a	0.43	nd	n/a	nd	nd	56	4	2
P-2W	14.6	nd	0.00	0.00	0.46	0.07	0.72	0.72	0.17	n/a	nd	n/a	nd	n/a	n/a	0.06	0.38	0.35	0.01	62.99	0.02	0.33	0.11	0.02	0.46	0.04	n/a	0.39	nd	n/a	nd	nd	67	4	2
P-2E	13.3	nd	0.00	0.00	0.52	0.05	0.83	0.83	0.20	n/a	nd	n/a	nd	n/a	n/a	0.09	0.22	0.45	0.01	49.02	0.03	0.18	0.06	0.02	0.29	0.05	n/a	0.32	nd	n/a	nd	nd	53	4	2
P-3W	11.4	nd	0.00	0.00	0.47	0.05	0.74	0.74	0.18	n/a	nd	n/a	nd	n/a	n/a	0.06	0.26	0.31	0.01	47.10	0.02	0.22	0.09	0.01	0.39	0.03	n/a	0.31	nd	n/a	nd	nd	51	4	2
P-3E	10.4	nd	0.00	0.00	nd	nd	nd	nd	nd	n/a	nd	n/a	nd	n/a	n/a	0.18	0.70	0.19	0.01	95.10	0.03	0.39	0.20	0.01	0.73	0.00	n/a	0.44	nd	n/a	nd	nd	98	2	0
P-4W	9.5	5.60	0.00	0.00	0.37	0.03	0.58	0.58	0.14	n/a	0.17	n/a	1.10	n/a	n/a	0.10	0.31	0.34	0.01	58.04	0.02	0.27	0.09	0.01	0.12	0.03	n/a	0.47	nd	n/a	nd	0.22	69	10	2
P-4E	8.6	2.25	0.00	0.00	0.37	0.03	0.58	0.58	0.14	n/a	0.17	n/a	0.83	n/a	n/a	0.12	0.49	0.18	0.01	69.64	0.02	0.31	0.17	0.01	0.47	0.01	n/a	0.56	nd	n/a	nd	0.17	77	7	2
?		nd	nd	nd	nd	nd	nd	nd	nd	n/a	nd	n/a	nd	n/a	n/a	0.06	0.61	0.35	0.02	113.73	0.03	0.45	0.17	0.02	0.31	nd	n/a	0.46	nd	n/a	nd	nd	116	2	0

SubReac	Distance from Rio Grande	Cyanide__Total HQ	Americium_241_GS HQ	Plutonium_239 HQ	Aroclor_1254 HQ	Aroclor_1260 HQ	DDE_4_4__HQ	DDT_4_4__HQ	Endrin_Aldehyde HQ	Acenaphthene HQ	Bis_2_ethylhexyl_phthalate HQ	Chrysene HQ	Naphthalene HQ	Antimony HQ	Antimony - detects HQ	Arsenic HQ	Barium HQ	Cadmium HQ	Chromium__Total HQ	Cobalt HQ	Copper HQ	Lead HQ	Manganese HQ	Mercury HQ	Selenium HQ	Silver HQ	Thallium HQ	Zinc HQ	Methylmercury_1_Ion HQ	Titanium HQ	Total_Uranium_by_ICPMS HQ	Uranium HQ	HI -all	HI - w/o Ba,Co,Mn	HI - PCB
ESL		310	####	110000	0.02	5	6.6	1	0.19	160	30	2.4	120	0.57	0.57	0.8	2.4	0.9	700	0.09	170	100	520	190	0.91	0.09	0.32	230	0	72	27	27			
DP-1W	16.4	nd	0.00	0.00	11.68	0.05	0.01	0.06	0.18	0.01	0.04	0.51	0.01	0.97	1.60	2.06	27.46	0.22	0.01	30.14	0.06	0.74	0.35	0.00	0.49	0.95	1.03	0.37	nd	nd	nd	nd	79	19	12
DP-1C	16.3	nd	0.00	0.00	1.71	0.03	nd	nd	nd	0.01	0.02	0.31	0.01	0.63	1.27	2.35	23.13	0.13	0.01	29.57	0.05	0.55	0.49	0.00	0.25	4.41	0.67	0.25	nd	nd	nd	nd	66	11	2
DP-1E	15.5	nd	0.00	0.00	2.38	0.02	0.00	0.02	0.10	0.01	0.03	0.41	0.01	0.89	1.82	2.59	23.21	0.25	0.02	27.50	0.05	0.97	0.47	0.00	0.37	1.12	1.01	0.31	nd	nd	nd	nd	64	11	3
DP-2	14.7	nd	0.00	0.00	1.68	0.02	0.00	0.04	0.03	0.00	0.02	0.16	0.00	3.04	1.81	2.36	27.25	0.20	0.01	35.39	0.05	0.41	0.58	0.00	0.44	3.86	0.82	0.23	nd	nd	nd	nd	78	13	2
DP-3	13.8	nd	0.00	0.00	2.06	0.01	0.00	0.02	0.03	0.01	0.03	0.22	0.01	0.73	1.93	1.94	20.29	0.14	0.01	28.46	0.03	0.34	0.37	0.00	0.37	1.46	1.03	0.16	nd	nd	nd	nd	60	9	2
DP-4	13.1	0.00	0.00	0.00	1.16	0.01	0.00	0.01	0.02	0.01	0.04	0.47	0.01	0.99	nd	2.16	20.90	0.06	0.01	24.22	0.07	0.31	0.45	0.00	0.31	1.35	0.77	0.18	nd	1.23	nd	0.25	55	9	1
LA-0	19.5	nd	nd	nd	0.86	0.01	0.00	0.02	0.01	0.00	0.02	0.26	0.01	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1	1	1
LA-1FW	18.4	nd	nd	0.00	0.87	0.01	0.00	0.01	0.01	0.00	0.02	0.31	0.01	0.37	nd	1.54	14.89	0.01	0.00	18.61	0.05	0.22	0.34	0.00	0.37	0.48	0.49	0.12	nd	nd	nd	nd	39	5	1
LA-1W+	17.5	nd	nd	0.00	16.90	0.02	0.00	0.01	0.01	0.00	0.01	0.08	0.00	0.35	nd	1.75	22.08	0.01	0.01	23.54	0.05	0.30	0.39	0.00	0.34	0.46	0.48	0.15	nd	nd	nd	nd	67	21	17
LA-1W	17.2	nd	nd	0.00	17.36	0.01	0.00	0.01	0.01	0.00	0.00	0.06	0.00	4.96	nd	1.75	26.63	0.28	0.01	32.14	0.05	0.35	0.49	0.00	0.33	8.12	0.40	0.19	nd	nd	nd	nd	93	34	17
LA-1C	15.7	nd	0.00	0.00	9.25	0.07	0.00	0.06	0.09	0.00	0.02	0.13	0.00	4.02	3.18	2.44	18.80	0.16	0.01	21.09	0.04	0.17	0.39	0.00	0.33	10.30	0.27	0.26	nd	nd	0.04	nd	71	28	9
LA-1E	14.8	nd	nd	0.00	1.78	0.04	0.00	0.01	0.02	0.00	0.01	0.09	0.00	3.80	nd	1.69	35.33	0.22	0.01	30.77	0.08	0.20	0.47	0.00	0.39	6.58	0.42	0.16	nd	nd	nd	nd	82	15	2
LA-2W	13.0	0.00	0.00	0.00	1.34	0.06	0.01	0.04	0.19	0.00	0.01	0.06	0.00	3.98	nd	2.57	25.09	0.14	0.01	24.62	0.05	0.27	0.51	0.00	0.41	37.68	0.81	0.24	nd	2.51	nd	0.18	101	51	2
LA-2E	12.6	0.00	0.00	0.00	0.78	0.02	0.00	0.00	0.01	0.00	0.01	0.10	0.00	5.63	nd	1.95	21.96	0.27	0.01	20.88	0.03	0.30	0.53	0.00	0.33	2.93	0.51	0.26	nd	2.84	nd	0.19	60	16	1
LA-2FE	11.2	nd	0.00	0.00	0.32	0.05	0.00	0.03	0.02	0.00	0.01	0.08	0.00	0.85	0.85	2.51	26.39	0.18	0.01	27.66	0.04	0.27	0.53	0.00	0.48	0.75	0.33	0.17	nd	nd	nd	nd	62	6	0
LA-3W	10.5	nd	0.00	0.00	0.96	0.03	0.00	0.02	0.03	0.00	0.01	0.09	0.00	0.61	0.79	2.13	22.29	0.10	0.01	24.36	0.04	0.25	0.46	0.00	0.24	0.41	0.37	0.18	nd	nd	nd	nd	53	5	1
LA-3	9.3	0.00	0.00	0.00	0.83	0.02	0.00	0.01	0.01	0.00	0.01	0.18	0.00	5.18	nd	1.39	21.95	0.28	0.01	28.30	0.05	0.26	0.48	0.00	0.15	9.55	0.26	0.18	nd	nd	nd	0.16	69	19	1
LA-3E	8.8	0.01	0.00	0.00	nd	nd	nd	nd	nd	0.00	0.01	0.12	0.00	0.66	1.12	3.80	115.21	0.54	0.01	71.98	0.11	0.40	2.86	0.00	1.34	0.91	1.40	0.48	nd	nd	nd	nd	201	10	0
LA-4W	6.0	nd	0.00	0.00	0.92	0.00	0.00	0.00	0.01	nd	nd	nd	nd	3.64	nd	1.26	21.88	0.24	0.01	24.40	0.05	0.22	0.39	0.00	0.18	3.59	0.51	0.11	nd	nd	nd	nd	57	11	1
LA-4E	5.0	nd	0.00	0.00	0.92	0.00	0.00	0.00	0.01	nd	nd	nd	nd	2.16	nd	1.58	21.94	0.13	0.00	24.87	0.03	0.08	0.42	0.00	0.25	1.63	0.80	0.09	nd	nd	nd	nd	55	8	1
LA-4FE	4.3	nd	0.00	0.00	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.67	0.90	2.64	53.02	0.03	0.01	51.24	0.07	0.18	1.03	0.00	0.26	1.78	0.62	0.23	nd	nd	nd	nd	113	6	0
LA-5	0.9	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	4.32	0.78	0.73	27.74	0.20	0.01	23.96	0.02	0.09	0.35	0.00	0.25	1.63	0.47	0.09	nd	2.91	nd	0.13	64	11	0
LA-5E	0.1	0.00	0.00	0.00	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.70	nd	2.82	61.74	0.24	0.01	42.95	0.05	0.18	1.21	0.00	0.65	0.44	0.80	0.15	nd	nd	nd	nd	112	6	0
Baseline	20.0	nd	0.00	0.00	nd	nd	nd	nd	nd	0.00	0.01	0.13	0.01	0.86	1.00	5.83	270.24	0.79	0.01	68.92	0.15	0.54	6.92	0.00	1.90	2.48	3.24	0.51	nd	nd	nd	nd	364	16	0
AC-1	19.1	nd	0.00	0.00	2.32	0.01	0.00	0.05	0.04	0.00	0.02	0.78	0.01	0.85	1.14	4.20	35.59	0.06	0.02	50.73	0.06	0.87	0.78	0.00	0.70	0.15	0.76	0.46	nd	nd	nd	nd	100	11	2
AC-2	18.8	nd	0.00	0.00	1.48	0.01	0.00	0.03	0.03	0.00	0.02	0.66	0.00	0.90	1.17	4.35	32.73	0.05	0.01	55.26	0.06	0.95	0.81	0.00	0.61	0.15	0.75	0.49	nd	nd	nd	nd	101	11	2
ACS	18.6	nd	0.00	0.00	1.54	0.00	0.00	0.04	0.02	0.00	0.01	0.17	0.00	0.44	0.74	2.05	10.67	0.29	0.01	17.98	0.05	0.56	0.31	0.00	0.27	2.86	0.35	0.16	0.32	nd	nd	nd	39	9	2
AC-3	18.3	0.00	0.00	0.00	44.89	0.03	0.00	0.03	0.04	0.00	0.01	0.20	0.00	0.75	0.34	1.85	18.03	0.48	0.01	25.74	0.04	0.36	0.47	0.00	0.43	3.41	0.66	0.18	nd	2.42	nd	0.10	100	56	45
P-1FW	18.5	nd	nd	nd	1.15	0.01	0.00	0.01	0.01	0.00	0.01	0.08	0.00	0.40	0.74	3.17	28.33	0.01	0.01	44.32	0.04	0.28	0.79	0.00	0.42	0.16	1.23	0.20	nd	nd	nd	nd	81	7	1
P-1W	18.3	0.00	0.00	0.00	0.81	0.02	0.00	0.01	0.01	0.00	0.01	0.10	0.00	0.89	0.94	2.96	41.01	0.24	0.01	34.07	0.07	0.39	0.99	0.00	0.51	4.29	0.66	0.28	0.05	2.46	nd	0.15	91	14	1
P-1E	17.8	0.00	0.00	0.00	2.41	0.01	0.00	0.00	0.00	0.00	0.01	0.22	0.00	1.73	1.25	2.18	28.09	0.32	0.01	30.23	0.04	0.29	0.74	0.00	0.43	3.02	0.55	0.21	0.05	2.67	nd	0.29	75	14	2
WC	17.8	nd	nd	nd	0.78	0.00	0.00	0.00	0.01	0.00	0.01	0.07	0.00	0.33	0.63	2.11	15.69	0.01	0.00	28.94	0.03	0.18	0.62	0.00	0.23	0.14	1.80	0.18	nd	nd	nd	nd	52	6	1
P-2W	14.6	nd	0.00	0.00	0.85	0.01	0.00	0.00	0.01	nd	nd	nd	nd	0.70	nd	1.40	36.86	0.28	0.01	35.30	0.05	0.18	0.83	0.00	0.55	5.98	1.06	0.17	nd	nd	nd	nd	84	11	1
P-2E	13.3	nd	0.00	0.00	0.98	0.00	0.00	0.00	0.01	nd	nd	nd	nd	0.56	nd	2.05	21.29	0.37	0.00	27.47	0.06	0.10	0.46	0.00	0.35	7.14	2.03	0.13	nd	nd	nd	nd	63	14	1
P-3W	11.4	nd	0.00	0.00	0.88	0.00	0.00	0.00	0.01	nd	nd	nd	nd	0.55	0.96	1.40	25.35	0.26	0.00	26.40	0.05	0.12	0.62	0.00	0.48	4.70	1.38	0.13	nd	nd	nd	nd	63	10	1
P-3E	10.4	nd	0.00	0.00	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.46	0.88	4.16	67.08	0.16	0.01	53.30	0.06	0.22	1.49	0.00	0.88	0.31	0.48	0.18	nd	nd	nd	nd	130	7	0
P-4W	9.5	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.01	0.00	0.01	0.12	0.00	2.15	nd	2.24	29.66	0.28	0.01	32.53	0.04	0.15	0.63	0.00	0.14	4.18	1.52	0.20	nd	3.24	nd	0.16	78	15	1
P-4E	8.6	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.01	0.00	0.01	0.06	0.00	0.91	1.13	2.74	46.83	0.15	0.01	39.03	0.04	0.17	1.21	0.00	0.57	0.98	2.44	0.24	nd	7.88	nd	0.12	105	17	1
?		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.14	nd	1.33	58.75	0.29	0.01	63.74	0.06	0.25	1.27	0.00	0.37	nd	4.06	0.19	nd	nd	nd	nd	131	8	0