INTERWEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP

Interwest Mining Company
Huntington Office
P. O. Box 310
15 North Main Street
Huntington, UT 84528

Utah Coal Program
Utah Division of Oil, Gas, and Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

March 30, 2016

Subj: Submittal of Annual Mine, Hydrology, and Subsidence Reports for 2015, PacifiCorp, Deer Creek Mine, C/015/0018, and Cottonwood/Wilberg Mine, C/015/0019, Emery County, Utah.

PacifiCorp, by and through its wholly-owned subsidiary, Interwest Mining Company, as mine manager, herewith submits the Annual Mine, Hydrology, and Subsidence Reports for 2015.

Note that the 2015 Raptor Data is included with this submittal. This is "CONFIDENTIAL" information as required by the Division.

If there are any questions or concerns, please call Dennis Oakley at 435-687-4825.

Sincerely,

Kenneth S. Fleck

Kenneth Fleck
Geology and Environmental Affairs Manager

Cc: file

Enclosures

RECEIVED
APR 04 2016
DIV. OF OIL, GAS & MINING

Print Form | Submit by Email | Reset Form

Annual Report

This Annual Report shows information the Division has for your mine. Submit the completed document and any additional information identified in the Appendices to the Division by the date specified in the cover letter. During a complete inspection an inspector will check and verify the information.

GENERAL INFORMATION

Company Name	PacifiCorp	Mine Name	Deer Creek Mine
Permit Number	C/015/0018	Permit expiration Date	February 7, 2016
Operator Name	Interwest Mining Company	Phone Number	+1 (435) 687-9821
Mailing Address	P.O. Box 310	Email	ken.fleck@pacificorp.com
City	Huntington		
State	Utah	Zip Code	84528

		DOGM File Location or Annual Report Location
Excess Spoil Piles	☐ Required ☒ Not Required	
Refuse Piles	☒ Required ☐ Not Required	
Impoundments	☒ Required ☐ Not Required	Included in Attachment A
Other: In-mine Sampling		Sampling of Roof, Rib, and Floor - Included in Attachment B

OPERATOR COMMENTS

Refuse pile inspection reports have been reported quarterly to the Division.

REVIEWER COMMENTS ☐ Met Requirements ☐ Did Not meet Requirements

COMMITMENTS AND CONDITIONS

The Permittee is responsible for ensuring annual technical commitments in the Mining and Reclamation Plan and conditions accepted with the permit are completed throughout the year. The Division has identified these commitments below and has provided space for you to report what you have done during the past year for each commitment. If additional written response is required, it should be filed as an attachment to this report.

Title: RAPTORS
Objective: To document the location and activity of nests that could be affected by mining.
Frequency: annually
Status: Ongoing
Reports: Submit annually in annual report.
Citation: MRP, Section 322, Subsection Terrestrial Species.

Operator Comments

Included in confidential file

Reviewer Comments ☐ Met Requirements ☐ Did Not Meet Requirements

Title: SUBSIDENCE MONITORING REPORT
Objective: To Determine the effects of subsidence
Frequency: Annually
Status: Ongoing
Reports: Submit in annual report
Citation: MRP, Volume 3, Appendix X

Operator Comments

Included with this submittal as stand alone report

Reviewer Comments ☐ Met Requirements ☐ Did Not Meet Requirements

Title: Wildlife
Objective: Adhere to wildlife exclusionary periods during reclamation activities
Frequency: During Reclamation
Status: Reclamation Pending
Reports: Not Required
Citation: MRP, Section 322, page 10; Section 330, page 16 #14; Section 342, page 32, #7

Operator Comments

N/A

Reviewer Comments ☐ Met Requirements ☐ Did Not Meet Requirements

Title: DEMONSTRATION OF SELECTED OVERBURDEN AS BEST AVAILABLE MATERIAL IN THE PERMIT AREA FOR USE AS SUBSTITUTE TOPSOIL.
Objective: Monitor chemical quality of identified substitute topsoil to show reduction in sodicity.
Frequency: Sampling will occur once within each permit term until such time as the soils are found acceptable for substitute topsoil use. The last sample, collected in 2010, did not show suitability. The current permit term is 2011-2016.
Status: To be conducted once in current permit term (2011-Feb 2016).
Reports: Annual Report
Citation: MRP, Volume 2, Part 4, section R645-301-233, page 2-3

Operator Comments

Sampled December 2, 2014 and reported in 2014 Annual Report.

Reviewer Comments ☐ Met Requirements ☐ Did Not Meet Requirements

FUTURE COMMITMENTS AND CONDITIONS

The following commitments are not required for the current annual report year, but will be required by the permittee in the future as indicated by the "status" field. These commitments are included for information only, and do not currently require action. If you feel that the commitment is no longer relevant or needs to be revised, please contact the Division.

Title: SUBSOIL TESTING
Objective: Regraded subsoil will be sampled on 500 ft intervals to a depth of four feet (three or four samples for the 2,000 linear feet in the facilities area). The samples will be analyzed on site for pH and EC. Problem areas will be further sampled and sent to a laboratory of analysis.
Frequency: At final regrading
Status: Ongoing at reclamation
Reports: Laboratory analysis to be provided to the Division
Citation: MRP, Volume 11, Section R645-301-231.300

Title: TOPSOIL HANDLING TESTING PLAN
Objective: Three composite samples will be taken from the facilities area and sediment pond. Samples will be analyzed for parameters to be compared with baseline information and to determine the need for amendments, including fertilizer.
Frequency: Final Reclamation
Status: Ongoing
Reports: Analysis to be provided to the Division
Citation: MRP, Volume 11, Section R645-301-242

Title: WASTE ROCK SITE RECLAMATION SAMPLING
Objective: Monitor chemical quality of upper four feet of final waste reclaimed surface at waste rock site.
Frequency: Grab samples within four feet of final elevation at a rate of two samples per acre per lift. Parameters as described.
Status: At final reclamation of waste rock cell.
Reports: Annual report
Citation: MRP, Volume 10, Chapter 7, page 7-5

Title: FISH & MACROINVERTEBRATE MONITORING
Objective: Monitor the fish and macroinvertebrates in Rilda Creek
Frequency: Spring/fall two years prior to and spring/fall one year immediately following start of construction. Spring every three years during operations and reclamation.
Status: Construction complete in fall 2008. Spring and Fall 2009 surveys complete. 2011 & 2014 surveys complete. Next survey expected for Spring 2017.
Reports: Annual Report
Citation: MRP, Volume 11, Biology Section, page 25.

OPERATOR COMMENTS (OPTIONAL)

REVIEWER COMMENTS

REPORTING OF OTHER TECHNICAL DATA

Please list other technical data or information that was not included in the form above, but is required under the approved plan, which must be periodically submitted to the Division.

Reviewer Comments

2015 Production Map is included with this report as Attachment C.

Please List Attachments

MAPS

Copies of mine maps, current and up-to-date, are to be provided to the Division as an attachment to this report in accordance with the requirements of R645-301-525.240. The map copies shall be made in accordance with 30 CFR 75.1200 as required by MSHA. Mine maps are not considered confidential.

Map Name	Map Number	Included		Confidential	
		Yes	No	Yes	No
Annual subsidence map	See Subsidence Report	☐	☐	☐	☒
Mine Map	N/A	☐	☐	☐	☒
Raptor survey within permit boundary		☐	☐	☒	☐
		☐	☐	☐	☐
		☐	☐	☐	☐

Reviewer Comments ☐ Met Requirements ☐ Did Not Meet Requirements

PacifiCorp

Deer Creek Mine

C/015/0018

2015 Annual Report

Attachment A

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 2
Permit Number	C/015/0018	Report Date	March 26, 2015
Mine Name	Deer Creek Mine		
Company Name	Energy West Mining		
Impoundment Identification	Impoundment Name	Mine Site Pond:	Waste Rock Pond:
	Impoundment Number		
	UPDES Permit Number	UT-0023604-001	
	MSHA ID Number	N/A	N/A

Inspection Date	3/18/15	Waste Rock Pond	3/18/15
Inspected By	Rick Cullum / Mark Reynolds		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	1st Quarter 2015 Inspection		

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

	Mine Site Pond	Waste Rock Pond
Conditions, Comments Etc.	No hazards observed.	No hazards observed.

Required for an impoundment which functions as a SEDIMENTATION POND.

Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

	Mine Site Pond:	Waste Rock Pond:
60% Design Storage Capacity ft.	1.87 A.F. at 7213.1 ft.	.59 A.F. at 6312.7
100% Sediment Capacity ft.	3.12 A.F. at 7216.0 ft.	.98 A.F. at 6313.45

Principle and emergency spillway elevations.

	Mine Site Pond	Waste Rock Pond
Principle Spillway Elevation (F.A.S.L.):	7218.64	6318.0
Emergency Spillway Elevation	7232.03	6318.0

ield Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

	Mine Site Pond	Waste Rock Pond
Water Elevation	7218.71 Top of ice	Dry
Discharging	Yes	Never
Inlet, Outlet, Spillway Conditions	Good	Good
Out slope Conditions	No Change	No Change

*See "Hydrologic Monitoring Data" report submitted quarterly to DOGM for monitoring information.

	Mine Site Pond	Waste Rock Pond
Sediment Volume	1.53 @7210.69	None
Remaining	**1.59** A.F.	0.59 A.F.
Water impounded	3.0 A.F.	0.0 AF

hanges, Comments, etc.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Mark A. Reynolds **Date:** 3-26-15

Signature: Richard Cullum **Date:** 3-30-15

LICENSED PROFESSIONAL ENGINEER
No. 5049079-2202
MARK A. REYNOLDS
3-26-15
STATE OF UTAH

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/015/0	Report Date	March 26, 2015
Mine Name	Deer Creek Mine		
Company Name	Energy West Mining		
Impoundment Identification	Impoundment Name	Rilda Canyon Pond	
	Impoundment Number		
	UPDES Permit Number	N/A	
	MSHA ID Number	N/A	N/A

Inspection Date	March 13, 2015
Inspected By	Rick Cullum / Mark Reynolds
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	1st Quarter 2015 Inspection

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

Conditions, Comments Etc. POND: No hazards observed. Small amount of water from recent rain storms.

Required for an impoundment which functions as a SEDIMENTATION POND.

Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

POND:

60% Design Storage Capacity ------ .076 A.F. at 7503.1

100% Sediment Capacity ---------- .126 A.F. at 7504.0

Principle and emergency spillway elevations.

	POND
Principle Spillway Elevation (F.A.S.L.):	7516.5 at 7503.1
Emergency Spillway Elevation	7516.5 at 7504.0

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

	POND
Water Elevation	Dry
Discharging	no
Inlet, Outlet, Spillway Conditions	Good
Out slope Conditions	Good

Sediment A. Volume	0.01 A.F. @ 7501.4
Remaining Sediment Storage Capacity	.116 A.F.
Water impounded	0.00 A.F.

Changes, Comments, etc. The construction of the pond was completed in early 4th quarter 2008. The pond is functioning as designed.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

LICENSED PROFESSIONAL ENGINEER No. 5049079-2202 MARK A. REYNOLDS 3-26-15 STATE OF UTAH

Signature: Mark Reynolds **Date:** 3-26-15

Signature: Richard Cullum **Date:** 3-30-15

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 2
Permit Number	C/015/0018	Report Date	June 29, 2015
Mine Name	Deer Creek Mine		
Company Name	Energy West Mining		
Impoundment Identification	Impoundment Name	Mine Site Pond:	Waste Rock Pond:
	Impoundment Number		
	UPDES Permit Number	UT-0023604-001	
	MSHA ID Number	N/A	N/A

Inspection Date	6/16/15	Waste Rock Pond	6/16/15
Inspected By	Rick Cullum / Mark Reynolds		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	2nd Quarter 2015 Inspection		

1. **Describe any appearance of any instability, structural weakness, or any other hazardous condition.**

	Mine Site Pond	Waste Rock Pond
Conditions, Comments etc.	No hazards observed.	No hazards observed.

Required for an impoundment which functions as a SEDIMENTATION POND.	**Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.**		
		Mine Site Pond:	**Waste Rock Pond:**
	60% Design Storage Capacity ft.	1.87 A.F. at 7213.1 ft.	.59 A.F. at 6312.7
	100% Sediment Capacity ft.	3.12 A.F. at 7216.0 ft.	.98 A.F. at 6313.45
	Principle and emergency spillway elevations.		
		Mine Site Pond	**Waste Rock Pond**
	Principle Spillway Elevation (F.A.S.L.):	7218.64	6318.0
	Emergency Spillway Elevation	7232.03	6318.0

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT		Page 1 of 2

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

	Mine Site Pond	Waste Rock Pond
Water Elevation	7225.21	Dry
Discharging	Yes	Never
Inlet, Outlet, Spillway Conditions	Good	Good
Out slope Conditions	No Change	No Change

*See "Hydrologic Monitoring Data" report submitted quarterly to DOGM for monitoring information.

	Mine Site Pond	Waste Rock Pond
Sediment Volume	2.26 @7214.40	None
Remaining	**0.86** A.F.	0.59 A.F.
Water impounded	5.94 A.F.	0.0 AF

Changes, Comments, etc.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: _____ **Date:** 6-29-15

Signature: Richard Cullum **Date:** 6/29/15

LICENSED PROFESSIONAL ENGINEER
No. 5049079-2202
MARK A. REYNOLDS
6-29-15
STATE OF UTAH

IMPOUNDMENT INSPECTION AND CERTI REPORT			
Permit Number	C/015/0018	Report Date	June 29, 2015
Mine Name	Deer Creek Mine		
Company Name	Energy West Mining		
Impoundment Identification	Impoundment Name	Rilda Canyon Pond	
	Impoundment Number		
	UPDES Permit Number	N/A	
	MSHA ID Number	N/A	N/A

Inspection Date	June 16, 2015
Inspected By	Rick Cullum / Mark Reynolds
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	2nd Quarter 2015 Inspection

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

Conditions, Comments Etc. POND: No hazards observed. Small amount of water from recent rain storms.

Required for an impoundment which functions as a SEDIMENTATION POND.

Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

POND:

60% Design Storage Capacity ------ .076 A.F. at 7503.1

100% Sediment Capacity ---------- .126 A.F. at 7504.0

Principle and emergency spillway elevations.

	POND
Principle Spillway Elevation (F.A.S.L.):	7516.5 at 7503.1
Emergency Spillway Elevation	7516.5 at 7504.0

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

	POND
Water Elevation	Dry
Discharging	no
Inlet, Outlet, Spillway Conditions	Good
Out slope Conditions	Good

Sediment A. Volume	0.01 A.F. @ 7501.4
Remaining Sediment Storage Capacity	.116 A.F.
Water impounded	0.00 A.F.

Changes, Comments, etc. The construction of the pond was completed in early 4th quarter 2008. The pond is functioning as designed.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

LICENSED PROFESSIONAL ENGINEER No. 5049079-2202 MARK A. REYNOLDS 6-24-15 STATE OF UTAH

Signature: _____ **Date:** 6-24-15

Signature: Richard Cullum **Date:** 6/29/15

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 2
Permit Number	C/015/0018	Report Date	Sept. 22, 2015
Mine Name	Deer Creek Mine		
Company Name	Interwest mining Co.		
Impoundment Identification	Impoundment Name	Mine Site Pond:	
	Impoundment Number		
	UPDES Permit Number	UT-0023604-001	
	MSHA ID Number	N/A	

Inspection Date	9/8/15
Inspected By	Rick Cullum / Mark Reynolds
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	3rd Quarter 2015 Inspection

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

Mine Site Pond

Conditions, Comments etc.

No hazards observed.

Required for an impoundment which functions as a SEDIMENTATION POND.	
	Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.
	Mine Site Pond:
	60% Design Storage Capacity 1.87 A.F. at 7213.1 ft.
	100% Sediment Capacity 3.12 A.F. at 7216.0 ft.
	Principle and emergency spillway elevations.
	Mine Site Pond
	Principle Spillway Elevation (F.A.S.L.): 7218.64
	Emergency Spillway Elevation 7232.03

Field Information. Provide current water elevation, whether pond is discharging, type and number of

amples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities ssociated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

Mine Site Pond

Water Elevation	7225.21
Discharging	Yes
Inlet, Outlet, Spillway Conditions	Good
Out slope Conditions	No Change

*See "Hydrologic Monitoring Data" report submitted quarterly to DOGM for monitoring information.

Mine Site Pond

Sediment Volume	2.26 @7214.40
Remaining	**0.86** A.F.
Water impounded	1.02 A.F.
Changes, Comments, ct.	**Level is changing each day because the sed pond is being being pumped out at this time, so it can be cleaned.**

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: _____ **Date:** 9-22-15

Signature: _____ **Date:** _____

LICENSED PROFESSIONAL ENGINEER
9-22-15
No. 5048079-2202
MARK A. REYNOLDS
STATE OF UTAH

IMPOUNDMENT INSPECTION AND CERTI) REPORT			
Permit Number	C/015/0018	Report Date	Sept. 22, 2015
Mine Name	Deer Creek Mine		
Company Name	Interwest Mining Co.		
Impoundment Identification	Impoundment Name	Rilda Canyon Pond	
	Impoundment Number		
	UPDES Permit Number	N/A	
	MSHA ID Number	N/A	N/A

Inspection Date	Sept. 8, 2015
Inspected By	Rick Cullum / Mark Reynolds
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	3rd Quarter 2015 Inspection

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

Conditions, Comments Etc. POND: No hazards observed. Small amount of water from recent rain storms.

Required for an impoundment which functions as a SEDIMENTATION POND.

Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

POND:

60% Design Storage Capacity ------ .076 A.F. at 7503.1

100% Sediment Capacity ---------- .126 A.F. at 7504.0

Principle and emergency spillway elevations.

	POND
Principle Spillway Elevation (F.A.S.L.):	7516.5 at 7503.1
Emergency Spillway Elevation	7516.5 at 7504.0

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

	POND
Water Elevation	Dry
Discharging	no
Inlet, Outlet, Spillway Conditions	Good
Out slope Conditions	Good

Sediment A. Volume	0.01 A.F. @ 7501.4
Remaining Sediment Storage Capacity	.116 A.F.
Water impounded	0.00 A.F.

Changes, Comments, etc. The construction of the pond was completed in early 4th quarter 2008. The pond is functioning as designed.

Qualification Statement

LICENSED PROFESSIONAL ENGINEER
No. 5049079-2202
MARK A. REYNOLDS
9-22-15
STATE OF UTAH

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: _____ **Date:** 9-22-15

Signature: _____ **Date:** _____

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 2
ermit Number	C/015/0018	Report Date	Dec. 17, 2015
Mine Name	Deer Creek Mine		
Company Name	Interwest mining Co.		
Impoundment Identification	Impoundment Name	Mine Site Pond:	
	Impoundment Number		
	UPDES Permit Number	UT-0023604-001	
	MSHA ID Number	N/A	

Inspection Date	12/10/15	
Inspected By	Rick Cullum / Mark Reynolds	
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)		4th Quarter 2015 Inspection

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

Mine Site Pond

Conditions, Comments
c.

The pond was cleaned in the Fourth Quarter of 2015. Because of mud and ice the pond will be floated for New sediment level as soon as the ice has melted.

Required for an impoundment which functions as a SEDIMENTATION POND.

Mine Site Pond:

60% Design Storage Capacity	1.87 A.F. at 7213.1 ft.
100% Sediment Capacity	3.12 A.F. at 7216.0 ft.

Principle and emergency spillway elevations.

Mine Site Pond

Principle Spillway Elevation (F.A.S.L.):	7218.64
Emergency Spillway Elevation	7232.03

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

Mine Site Pond

Water Elevation	7213.41
Discharging	No
Inlet, Outlet, Spillway Conditions	Good
Out slope Conditions	No Change

*See "Hydrologic Monitoring Data" report submitted quarterly to DOGM for monitoring information.

Mine Site Pond

Sediment Volume	See Comment below
Remaining	N/A
Water impounded	See Comment below
Changes, Comments, Ect.	**The pond was cleaned in the Fourth Quarter of 2015. Because of mud and Ice the pond will be floated for New Sediment level as soon as the ice has melted.**

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: _____ **Date:** 12-17-15

Signature: Richard Cullum **Date:** 12-17-15

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 2
Permit Number	C/015/0018	Report Date	Nov. 16, 2015
Mine Name	Deer Creek Mine		
Company Name	Inter West Mining (Ownership: Bowie Refined Coals LLC)		
Impoundment Identification	Impoundment Name	Waste Rock Pond:	
	Impoundment Number	N/A	
	UPDES Permit Number	N/A	
	MSHA ID Number	N/A	N/A

Inspection Date	Waste Rock Pond 11/16/15
Inspected By	Rick Cullum / Mark Reynolds
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	4th Quarter 2015 Inspection

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

Waste Rock Pond

Conditions, Comments Etc. No hazards observed.

Required for an impoundment which functions as a SEDIMENTATION POND.	Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.	
		Waste Rock Pond:
	60% Design Storage Capacity	.59 A.F. at 6312.7 ft.
	100% Sediment Capacity	.98 A.F. at 6313.45 ft.
	Principle and emergency spillway elevations.	
		Waste Rock Pond
	Principle Spillway Elevation (F.A.S.L.):	6318.0
	Emergency Spillway Elevation	6318.0

Field Information. Provide current water elevation, whether pond is discharging, type and number of

samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

	Waste Rock Pond
Water Elevation	Dry
Discharging	Never
Inlet, Outlet, Spillway Conditions	Good
Out slope Conditions	No Change

*See "Hydrologic Monitoring Data" report submitted quarterly to DOGM for monitoring information.

	Waste Rock Pond
Sediment Volume	None
Remaining	0.59 A.F.
Water impounded	0.0 AF
Changes, Comments, etc.	

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: _____ Date: 11-17-15

Signature: _____ Date: 11-18-15

LICENSED PROFESSIONAL ENGINEER
No. 5049079-2202
MARK A. REYNOLDS
11-17-15
STATE OF UTAH

IMPOUNDMENT INSPECTION AND CERTIF REPORT			
Permit Number	C/015/0016	Report Date	Dec. 17, 2015
Mine Name	Deer Creek Mine		
Company Name	Interwest Mining Co.		
Impoundment Identification	Impoundment Name	Rilda Canyon Pond	
	Impoundment Number		
	UPDES Permit Number	N/A	
	MSHA ID Number	N/A	N/A

Inspection Date	Dec. 10, 2015
Inspected By	Rick Cullum / Mark Reynolds
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	4th Quarter 2015 Inspection

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

Conditions, Comments Etc. POND: No hazards observed

Required for an impoundment which functions as a SEDIMENTATION POND.

Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

POND:

60% Design Storage Capacity ------ .076 A.F. at 7503.1

100% Sediment Capacity ---------- .126 A.F. at 7504.0

Principle and emergency spillway elevations.

	POND
Principle Spillway Elevation (F.A.S.L.):	7516.5 at 7503.1
Emergency Spillway Elevation	7516.5 at 7504.0

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

	POND
Water Elevation	Dry
Discharging	no
Inlet, Outlet, Spillway Conditions	Good
Out slope Conditions	Good

Sediment A. Volume	0.01 A.F. @ 7501.4
Remaining Sediment Storage Capacity	.116 A.F.
Water impounded	0.00 A.F.

Changes, Comments, etc. The construction of the pond was completed in early 4th quarter 2008. The pond is functioning as designed.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Mark Reynolds **Date:** 12-17-15

Signature: Richard Cullum **Date:** 12-17-15

PacifiCorp

Deer Creek Mine

C/015/0018

2015 Annual Report

Attachment B

Inter-Mountain Labs
1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Date: 2/9/2015

CLIENT: Energy West Mining Co
Project: Deer Creek Mine
Lab Order: S1501197

CASE NARRATIVE

Report ID: S1501197001

Samples DC 0115, DC 0215, DC 0315, DC 0415, DC 0515, DC 0615, and DC 0715 were received on January 19, 2015.

Samples were analyzed using the methods outlined in the following references:

U.S.E.P.A. 600/2-78-054 "Field and Laboratory Methods Applicable to Overburden and Mining Soils", 1978
American Society of Agronomy, Number 9, Part 2, 1982
USDA Handbook 60 "Diagnosis and Improvement of Saline and Alkali Soils", 1969
Wyoming Department of Environmental Quality, Land Quality Division, Guideline No. 1, 1984
New Mexico Overburden and Soils Inventory and Handling Guideline, March 1987
State of Utah, Division of Oil, Gas, and Mining: Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining, April 1988
Montana Department of State Lands, Reclamation Division: Soil, Overburden, and Regraded Spoil Guidelines, December 1994
State of Nevada Modified Sobek Procedure
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition

Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Inter-Mountain Labs
1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Soil Analysis Report

Energy West Mining Co
P.O. Box 310
Huntington, UT 84528

Report ID: S1501197001

Project: Deer Creek Mine
Date Received: 1/19/2015

Date Reported: 2/9/2015
Work Order: S1501197

Lab ID	Sample ID	pH s.u.	Electrical Conductivity dS/m	Color C.U.	PE Calcium meq/L	PE Magnesium meq/L	PE Potassium meq/L	PE Sodium meq/L	SAR
S1501197-001	DC 0115	8.4	0.42	10YR 5/1	1.59	1.26	0.47	0.62	0.52
S1501197-002	DC 0215	8.0	0.62	10YR 2/1	2.49	1.69	0.12	1.69	1.17
S1501197-003	DC 0315	8.4	0.18	10YR 2/1	0.44	0.21	0.01	0.57	1.00
S1501197-004	DC 0415	8.0	1.53	10YR 6/1	5.00	6.82	3.93	1.88	0.78
S1501197-005	DC 0515	8.1	0.55	10YR 4/1	2.20	2.09	0.45	0.85	0.58
S1501197-006	DC 0615	8.2	0.34	10YR 2/1	1.72	0.87	0.05	0.66	0.58
S1501197-007	DC 0715	8.2	0.32	10YR 2/1	1.67	0.74	0.05	0.59	0.53

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Inter-Mountain Labs
1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Your Environmental Monitoring Partner

Soil Analysis Report

Energy West Mining Co
P.O. Box 310
Huntington, UT 84528

Report ID: S1501197001

Project: Deer Creek Mine
Date Received: 1/19/2015

Date Reported: 2/9/2015
Work Order: S1501197

Lab ID	Sample ID	Sand %	Silt %	Clay %	Texture	Boron ppm	Selenium ppm
S1501197-001	DC 0115	39.0	42.0	19.0	Loam	0.32	<0.02
S1501197-002	DC 0215	96.0	4.0	<0.1	Sand	0.18	<0.02
S1501197-003	DC 0315	97.0	3.0	<0.1	Sand	0.18	<0.02
S1501197-004	DC 0415	68.0	24.0	8.0	Sandy Loam	0.07	<0.02
S1501197-005	DC 0515	42.0	34.0	24.0	Loam	0.33	<0.02
S1501197-006	DC 0615	95.0	5.0	<0.1	Sand	0.23	<0.02
S1501197-007	DC 0715	97.0	3.0	<0.1	Sand	0.15	<0.02

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Inter-Mountain Laboratories, Inc.

CHAIN OF CUSTODY RECORD

Client/Project Name: ENERGY WEST MINING CO.

Project Location: DEER CREEK MINE

ANALYSES / PARAMETERS: (SEE ATTACHED LIST)

Sampler: (Signature) Kenneth S. Fleck

Chain of Custody Tape No.

Sample No./ Identification	Date	Time	Lab Number	Matrix	No. of Containers					Remarks
DC 0115	1/15/15	10:00A	51501197-001	MUDSTONE	1					
DC 0215	1/15/15	10:00A	-002	COAL	1					
DC 0315	1/15/15	10:00A	-003	COAL	1					
DC 0415	1/15/15	10:00A	-004	ROCK	1					
DC 0515	1/15/15	11:00A	-005	MUDSTONE	1					
DC 0615	1/15/15	11:00A	-006	COAL	1					
DC 0715	1/15/15	11:00A	-007	COAL	1					

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Kenneth S. Fleck	1/16/15	10:00 AM	Karen A Seco	1/19/15	
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by laboratory: (Signature)	Date	Time

Inter-Mountain Laboratories, Inc.

- [x] 1633 Terra Avenue, Sheridan, Wyoming 82801, Telephone (307) 672-8945
- [ ] 1701 Phillips Circle, Gillette, Wyoming 82718, Telephone (307) 682-8945
- [ ] 2506 West Main Street, Farmington, NM 87401, Telephone (505) 326-4737
- [ ] 1160 Research Dr., Bozeman, Montana 59715, Telephone (406) 586-8450
- [ ] 11183 SH 30, College Station, TX 77845, Telephone (409) 776-8945
- [ ] 3304 Longmire Drive, College Station, TX 77845, Telephone (409) 774-4999

35103

Operational Analysis

1. Analysis will include the following:

- pH
- Texture
- Electrical Conductivity (mmhos/cm @ 25 C)
- Sodium Adsorption Ration (SAR)
- *Water Extractable Selenium (mg/Kg)
- *Water Extractable Boron (mg/Kg)
- Color (fines only)

* One of two samples/acre

2. Analysis will be conducted in accordance with Division Guidelines on Management of Topsoil and Overburden Materials.

ENERGY WEST MINING CO.
15 N. MAIN ST.
HUNTINGTON UTAH 84501

KEN FLECK 435 687 4712

S1501197

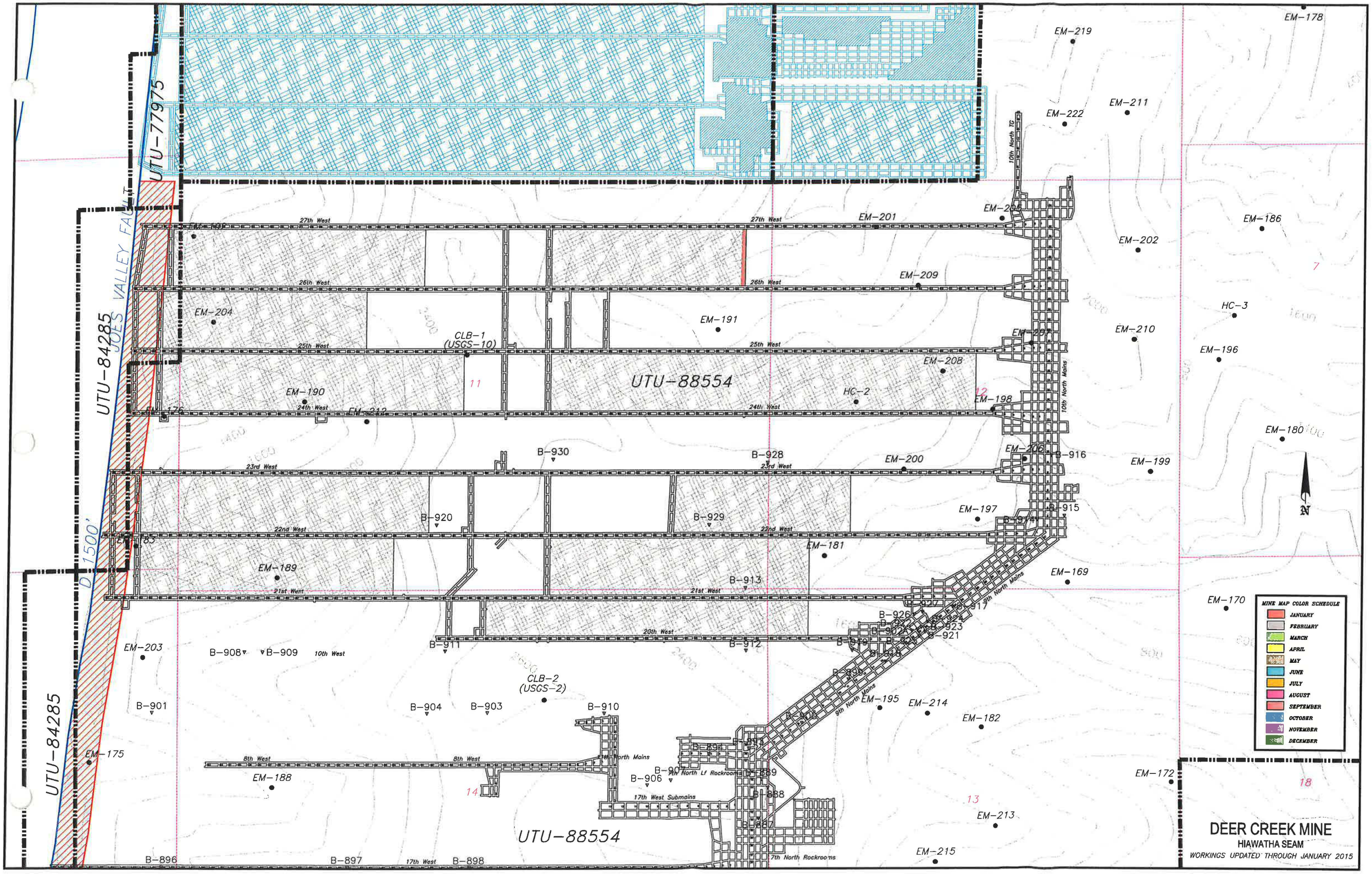
PacifiCorp

Deer Creek Mine

C/015/0018

2015 Annual Report

Attachment C


UTU-77975
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JOES VALLEY FAULT
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27th West
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10th North TG
10th North Mains
9th North Mains
7th North Mains
7th North Lf Rockrooms
17th West Submains
7th North Rockrooms
EM-178
EM-219
EM-211
EM-222
EM-205
EM-201
EM-186
EM-202
EM-209
EM-204
EM-191
CLB-1
(USGS-10)
HC-3
EM-210
EM-207
EM-196
EM-208
EM-190
HC-2
EM-198
EM-176
EM-212
EM-180
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EM-206
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CLB-2
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EM-175
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EM-188
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EM-213
EM-215
B-896
B-897
B-898
N
MINE MAP COLOR SCHEDULE
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
DEER CREEK MINE
HIAWATHA SEAM
WORKINGS UPDATED THROUGH JANUARY 2015

Print Form | Submit by Email | Reset Form

Annual Report

This Annual Report shows information the Division has for your mine. Submit the completed document and any additional information identified in the Appendices to the Division by the date specified in the cover letter. During a complete inspection an inspector will check and verify the information.

GENERAL INFORMATION

Company Name	Interwest Mining Company	Mine Name	Cottonwood/Wilberg
Permit Number	C/015/0019	Permit expiration Date	07/06/2019
Operator Name	PacifiCorp	Phone Number	+1 (435) 687-9821
Mailing Address	P.O. Box 310	Email	ken.fleck@pacificorp.com
City	Huntington		
State	Utah	Zip Code	84258

		DOGM File Location or Annual Report Location
Excess Spoil Piles	☐ Required ☒ Not Required	
Refuse Piles	☐ Required ☒ Not Required	
Impoundments	☒ Required ☐ Not Required	Included in Attachment A
Other:		

OPERATOR COMMENTS

Refuse pile inspection reports have been reported quarterly to the Division. The refuse pile for Cottonwood was transferred to Bowie Resource Partners in June 2015.

REVIEWER COMMENTS ☐ Met Requirements ☐ Did Not meet Requirements

MAPS

Copies of mine maps, current and up-to-date, are to be provided to the Division as an attachment to this report in accordance with the requirements of R645-301-525.240. The map copies shall be made in accordance with 30 CFR 75.1200 as required by MSHA. Mine maps are not considered confidential.

Map Name	Map Number	Included		Confidential	
		Yes	No	Yes	No
		☐	☒	☐	☐
		☐	☐	☐	☐
		☐	☐	☐	☐
		☐	☐	☐	☐
		☐	☐	☐	☐

Reviewer Comments ☐ Met Requirements ☐ Did Not Meet Requirements

REPORTING OF OTHER TECHNICAL DATA

Please list attachments:

Please list other technical data or information that was not included in the form above, but is required under the approved plan, which must be periodically submitted to the Division.

Reviewer Comments

FUTURE COMMITMENTS AND CONDITIONS

The following commitments are not required for the current annual report year, but will be required by the permittee in the future as indicated by the "status" field. These commitments are included for information only, and do not currently require action. If you feel that the commitment is no longer relevant or needs to be revised, please contact the Division.

Title: Vegetation Monitoring
Objective: To evaluate vegetation success
Frequency: Annual
Status: Pending revegetation
Reports: All vegetation monitoring data will be reported annually. This report will contain a narrative of the actual monitoring methods used, results, and a discussion of the overall success or failure of each area. Raw data sheets will also be included in the annual reports.
Citation: V. 2, part 4, page 25, Figure 3

Operator Comments

PacifiCorp

Cottonwood/Wilberg Mine

C/015/0019

2015 Annual Report

Attachment A

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 2
Permit Number	C/015/0019	Report Date	March 26, 2015
Mine Name	Cottonwood/Wilberg		
Company Name	PacifiCorp		
Impoundment Name...	North Pond	South Pond	Waste Rock Pond
Impoundment Number.			
UPDES Permit Number		UT 0022896-003A	UT 0022896-005
MSHA ID NUMBER.....	1211-UT-09-02052-02	1211-UT-09-02052-03	

IMPOUNDMENT INSPECTION

Inspection Date	March 6, 2015
Inspected By	Rick Cullum/ Mark Reynolds
	1st Quarter Inspection 2015

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

North Pond: No instabilities or weaknesses observed.

South Pond: No instabilities or weaknesses observed.

Waste Rock Site Pond: No instabilities observed.

Required for an impoundment which functions as a SEDIMENTATION POND.

Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

Pond	North Pond	South Pond	Waste Rock
60% Design Storage Capacity	.34 A.F. at 7351.0 ft.	.19 A.F. at 7322.3 ft.	1.45 A.F. at 6763.6 ft.
100% Sediment Capacity	.56 A.F. at 7354.83 ft.	.32 A.F. at 7325.33 ft.	2.42 A.F. at 6765.3 ft.

Principle and emergency spillway elevations.

	North Pond	South Pond	Waste Rock Pond
Principal Spillway Elevation	7354.83	7325.33	6766.3
Emergency Spillway Elevation	7363.33	7334.2	6770.0

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.

	North Pond	South Pond	Waste Rock Pond
Water Elevation	7351.45 Top of ice	Dry	small amount from Melting snow
Discharging	NO	NO	No
Inlet/Outlet Condition	Good	Good	Good
Slope conditions	Good	Good	Good

*See "Hydrologic Monitoring Data" report submitted to DOGM quarterly for monitoring information.

Field Evaluation. Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

	North Pond	South Pond	Waste Rock Pond
Sediment Volume	0.10 AF @7348 ft.	0.00 AF	1.95 AF @6764.52 ft
Remaining Sediment Storage Capacity	0.24 AF	0.19 AF	.0 AF
Water Impounded	0.16 AF	0.0 AF	0.00 AF

Changes, Comments,

THE COTTONWOOD MINE WAS IDLED IN 2001, SO THE ONLY WATER THAT REPORTS TO THE PONDS ARE RUN-OFF DURING A STORM EVENT. REPAIRS TO THE BASE OF THE STANDPIPE AREA WERE COMPLETED.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

LICENSED PROFESSIONAL ENGINEER
No. 5049079-2202
MARK A. REYNOLDS
3-26-15
STATE OF UTAH

Signature: Mark Reynolds **Date:** 3-26-15

Signature: Richard Cullen **Date:** 3-30-15

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 2
Permit Number	C/015/0019	Report Date	May 6, 2015
Mine Name	Cottonwood/Wilberg		
Company Name	PacifiCorp		
Impoundment Name...	North Pond	South Pond	Waste Rock Pond
Impoundment Number.			
UPDES Permit Number		UT 0022896-003A	UT 0022896-005
MSHA ID NUMBER.....	1211-UT-09-02052-02	1211-UT-09-02052-03	

IMPOUNDMENT INSPECTION

Inspection Date	April 21, 2015	
Inspected By	Rick Cullum/ Mark Reynolds	
		2nd Quarter Inspection 2015

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

North Pond: No instabilities or weaknesses observed.

South Pond: No instabilities or weaknesses observed.

Waste Rock Site Pond: No instabilities observed.

Required for an impoundment which functions as a SEDIMENTATION POND.

Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

Pond	North Pond	South Pond	Waste Rock
60% Design Storage Capacity	.34 A.F. at 7351.0 ft.	.19 A.F. at 7322.3 ft.	1.45 A.F. at 6763.6 ft.
100% Sediment Capacity	.56 A.F. at 7354.83 ft.	.32 A.F. at 7325.33 ft.	2.42 A.F. at 6765.3 ft.

Principle and emergency spillway elevations.

	North Pond	South Pond	Waste Rock Pond
Principal Spillway Elevation	7354.83	7325.33	6766.3
Emergency Spillway Elevation	7363.33	7334.2	6770.0

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.

	North Pond	South Pond	Waste Rock Pond
Water Elevation	7351.45 Top of ice	Dry	Pond was cleaned in April 2015
Discharging	NO	NO	No
Inlet/Outlet Condition	Good	Good	Good
Slope conditions	Good	Good	Good

*See "Hydrologic Monitoring Data" report submitted to DOGM quarterly for monitoring information.

Field Evaluation. Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

	North Pond	South Pond	Waste Rock Pond
Sediment Volume	0.10 AF @7348 ft.	0.00 AF	1.31 AF @6762.8 ft
Remaining Sediment Storage Capacity	0.24 AF	0.19 AF	1.11 AF
Water Impounded	0.16 AF	0.0 AF	0.00 AF

Changes, Comments,

THE COTTONWOOD MINE WAS IDLED IN 2001, SO THE ONLY WATER THAT REPORTS TO THE PONDS ARE RUN-OFF DURING A STORM EVENT. REPAIRS TO THE BASE OF THE STANDPIPE AREA WERE COMPLETED. Waste rock site Pond was cleaned in April of 2015

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

LICENSED PROFESSIONAL ENGINEER
No. 5049079-2202
MARK A. REYNOLDS
STATE OF UTAH

Signature: _____ Date: 5-6-15

Signature: Richard Cullum Date: 5-7-15

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 2
Permit Number	C/015/0019	**Report Date**	June 29, 2015
Mine Name	Cottonwood/Wilberg		
Company Name	PacifiCorp		
Impoundment Name...	**North Pond**	**South Pond**	**Waste Rock Pond**
Impoundment Number.			
UPDES Permit Number		UT 0022896-003A	UT 0022896-005
MSHA ID NUMBER.....	1211-UT-09-02052-02	1211-UT-09-02052-03	

IMPOUNDMENT INSPECTION

Inspection Date	June 15, 2015
Inspected By	Rick Cullum/ Mark Reynolds
	2nd Quarter Inspection 2015

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

North Pond: No instabilities or weaknesses observed.

South Pond: No instabilities or weaknesses observed.

Waste Rock Site Pond: No instabilities observed.

Required for an impoundment which functions as a SEDIMENTATION POND.

Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

	North Pond	South Pond	Waste Rock
Pond			
60% Design Storage Capacity	.34 A.F. at 7351.0 ft.	.19 A.F. at 7322.3 ft.	1.45 A.F. at 6763.6 ft.
100% Sediment Capacity	.56 A.F. at 7354.83 ft.	.32 A.F. at 7325.33 ft.	2.42 A.F. at 6765.3 ft.

Principle and emergency spillway elevations.

	North Pond	South Pond	Waste Rock Pond
Principal Spillway Elevation	7354.83	7325.33	6766.3
Emergency Spillway Elevation	7363.33	7334.2	6770.0

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.

	North Pond	South Pond	Waste Rock Pond
Water Elevation	7353.05	7320.46	sold waste rock site and pond
Discharging	NO	NO	No
Inlet/Outlet Condition	Good	Good	Good
Slope conditions	Good	Good	Good

*See "Hydrologic Monitoring Data" report submitted to DOGM quarterly for monitoring information.

Field Evaluation. Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

	North Pond	South Pond	Waste Rock Pond
Sediment Volume	0.10 AF @7348 ft.	0.00 AF	0 AF
Remaining Sediment Storage Capacity	0.24 AF	0.19 AF	.0 AF
Water Impounded	0.29 AF	0.04 AF	0.00 AF

Changes, Comments,

THE COTTONWOOD MINE WAS IDLED IN 2001, SO THE ONLY WATER THAT REPORTS TO THE PONDS ARE RUN-OFF DURING A STORM EVENT. REPAIRS TO THE BASE OF THE STANDPIPE AREA WERE COMPLETED.

Qualification Statement

LICENSED PROFESSIONAL ENGINEER
No. 5049079-2202
MARK A. REYNOLDS
6-29-15
STATE OF UTAH

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Mark A. Reynolds **Date:** 6-29-15

Signature: Richard Cullum **Date:** 6/29/15

INTERWEST
MINING COMPANY
A SUBSIDIARY OF PACIFICORP

June 29, 2015

District Manager (9)
Mine Safety and Health Administration
P.O. Box 25367
Denver, Colorado 80225

Re: Cottonwood Mine / Trail Mountain Mine MSHA ID# 42-01211
Cottonwood Coal Blending and Preparation Facility MSHA ID# 42-02052:
North Sediment Pond: MSHA I.D. 1211-UT-09-02052-02
South Sediment Pond: MSHA I.D. 1211-UT-09-02052-03

Dear Sir:

As of June 5, 2015, PacifiCorp transferred ownership of the Trail Mountain Mine to Bowie Resource Partners LLC along with the Cottonwood Mine Waste Rock Facility which will now be the waste rock facility for the Trail Mountain Mine. The Cottonwood Mine site remains under the control of PacifiCorp. Also as of June 5, 2015, PacifiCorp has transferred ownership of the Cottonwood Coal Blending and Preparation Facility to Bowie Resource Partners LLC.

Several changes in ID number status will need to occur:

Cottonwood Mine is now under separate ownership from the Trail Mountain Mine. Cottonwood mine is currently in the demolition and reclamation process. The portals are sealed and backfilled, and all surface facilities have been removed. Will the Cottonwood mine require an MSHA ID number given the closure, demolition, and reclamation status? PacifiCorp requests that MSHA issue a new ID number for the Cottonwood Mine if necessary.

Transfer of ownership of the Cottonwood Coal Blending and Preparation facility will require a separation of MSHA inspected facilities associated with the Cottonwood Coal Blending and Preparation Facility and the Cottonwood Mine. Two sediment ponds located at the Cottonwood Mine have used the Cottonwood Coal Blending and Preparation Facility MSHA ID since 2001. PacifiCorp requests that MSHA issue a new ID number for the Cottonwood Mine Sediment Pond structures if necessary.

If you have any questions about these proposed changes, contact me at (435) 687-4712.

Sincerely,

Kenneth S. Fleck

Ken Fleck
Geology and Environmental Affairs Manager
PacifiCorp - Interwest Mining Company
Huntington Office
P.O. Box 310
Huntington, UT 84528

Cc: Tony Koss
Dennis Oakley
Chuck Semborski

INTERWEST
MINING COMPANY
A SUBSIDIARY OF PACIFICORP

July 2, 2015

District Manager (9)
Mine Safety and Health Administration
P.O. Box 25367
Denver, Colorado 80225

Re: Annual Impoundment Report
Cottonwood Coal Blending and Preparation Facility MSHA ID# 42-02052:
North Sediment Pond: MSHA I.D. 1211-UT-09-02052-02
South Sediment Pond: MSHA I.D. 1211-UT-09-02052-03

Dear Sir:

Attached, please find the annual report for the above referenced impoundments associated with the Cottonwood Coal Blending and Preparation Facility.

As of June 5, 2015, the ownership status of the Cottonwood Coal Blending and Preparation Facility has changed; please see the attached copy of the letter already sent to MSHA District 9, dated June 29, 2015.

As of June 29, 2015 the following corporate changes have been made concerning Energy West Mining Company:

Energy West Mining Company will no longer be the operating company for PacifiCorp's mining operations. The operation of the Deer Creek Mine is now the responsibility of East Mountain Energy, LLC, a new independent mining company. The operating company for PacifiCorp's remaining Cottonwood / Wilberg mine operations (where these ponds are located) will be Interwest Mining Company, an existing subsidiary of PacifiCorp.

Permitting and compliance obligations (including these impoundment reports) for Cottonwood / Wilberg Mine as well as the Deer Creek Mine and Deer Creek Waste Rock Site will be the responsibility of Interwest Mining Company, the existing subsidiary of PacifiCorp. The impoundment reports will now be kept at the Interwest Mining Company Huntington office at the address shown below.

If you have any questions, contact me at (435) 687-4712.

Sincerely,

Kenneth S. Fleck

Ken Fleck
Geology and Environmental Affairs Manager
PacifiCorp - Interwest Mining Company
Huntington Office
15 North Main Street
P.O. Box 310
Huntington, UT 84528

Attachments; Annual Impoundment Report July 2014 - June 2015
Letter to MSHA dated June 29, 2015

Cc: Tony Koss - EMM
Dennis Oakley - IMC
Chuck Semborski - IMC

COTTONWOOD COAL BLENDING AND PREPARATION FACILITY
42-02052

ANNUAL IMPOUNDMENT REPORT
JULY 2014- JUNE 2015

North Impoundment: MSHA I.D. 1211-UT-09-02052-02
South Impoundment: MSHA I.D. 1211-UT-09-02052-03

Regulation	Report Data
General Information	The North and South Impoundment structures at the Cottonwood Facility meet the requirements of a MSHA Impoundment because the height of the earthen dam structure exceeds 20 feet. The impoundments have the following capacities: North Impoundment · Total Capacity = 2.26 A.F. · Total Sediment Capacity = .56 A.F. · 60% Sediment Cap. = .34 A.F. (Cleaning Level) · Dam Height = 24'8" South Impoundment · Total Capacity = 2.16 A.F. · Total Sediment Capacity = .32 A.F. · 60% Sediment Cap. = .19 A.F. (Cleaning Level) · Dam Height = 22'0" Inspections are done monthly, an approved variance, by the MSHA District Manager. Monthly inspections were by Guy Davis and Mark Reynolds, Certified MSHA Impoundment Inspectors. Sediment volume quarterly inspections were by Rick Cullum, under the direction of Mark Reynolds P.E.
30 CFR 77.216-4(a)(1)	There have been no geometric or structural changes.
30 CFR 77.216-4(a)(2)	No functional flow measuring device is currently in place. Discharge flows are rare because of the permanent closure of the mine site. Flows are measured by the bucket and stop watch method. There was no discharge from the South Impoundment during the reporting year.
30 CFR 77.216-4(a)(3)	The South Impoundment maximum water/ice elevation was 7320.08. The minimum depth was dry. The dry elevation is 7319.10', which is 6.23' below the normal discharge elevation. The North Impoundment maximum water elevation was 7348.91'. The minimum depth was dry. The dry elevation is 7347.71', which is 7.12' below the normal discharge elevation. Present water elevation of the North Impoundment is 4.20' on the staff gauge; South Impoundment is 2.6' (dry). The impoundments are surveyed and inspected quarterly, in addition to the required MSHA monthly inspection, to determine sediment accumulation. The impoundments are cleaned when the sediment volume reaches the 60% design capacity. (See above)

30 CFR 77.216-4(a)(4)	The Storage Capacities are: North Impoundment · Total Capacity - 2.26 A.F. · Total Sediment Capacity - .56 A.F. · 60% Sediment Cap. - .34 A.F. South Impoundment · Total Capacity - 2.16 A.F. · Total Sediment Capacity - .32 A.F. · 60% Sediment Cap. - .19 A.F.
30 CFR 77.216-4(a)(5)	Based on 6/24/14 Survey: North Impoundment · Water Impounded - .0 A.F. · Sediment Volume - .10 A.F. · Remaining Sediment Capacity -.24 A.F. South Impoundment · Water Impounded -.0 A.F. · Sediment Volume - .0 A.F. · Remaining Sediment Capacity - .19 A.F.
30 CFR 77.216-4(a)(6)	See comments on 30 CFR 77.216-4(a)(1)
30 CFR 77.216-4(a)(7)	I, MARK REYNOLDS, BEING A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF UTAH, DO HEREBY CERTIFY THAT THE INFORMATION CONTAINED IN THIS REPORT IS TRUE AND ACCURATE, THAT ALL CONSTRUCTION, OPERATION AND MAINTENANCE DONE ON THE IMPOUNDMENTS, DURING THIS REPORTING YEAR, WAS IN ACCORDANCE WITH THE APPROVED PLAN TO THE BEST OF MY KNOWLEDGE AND BELIEF. LICENSED PROFESSIONAL ENGINEER No. 5049078-2202 MARK A. REYNOLDS 6-30-15 STATE OF UTAH

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 2
Permit Number	C/015/0019	**Report Date**	Sept. 22, 2015
Mine Name	Cottonwood/Wilberg		
Company Name	PacifiCorp		
Impoundment Name...	**North Pond**	**South Pond**	
Impoundment Number.			
UPDES Permit Number		UT 0022896-003A	
MSHA ID NUMBER.....	1211-UT-09-02052-02	1211-UT-09-02052-03	

IMPOUNDMENT INSPECTION

Inspection Date	Sept. 8, 2015	
Inspected By	Rick Cullum/ Mark Reynolds	
		3rd Quarter Inspection 2015

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

North Pond: No instabilities or weaknesses observed.

South Pond: No instabilities or weaknesses observed.

Waste Rock Site Pond: No instabilities observed.

Required for an impoundment which functions as a SEDIMENTATION POND.

Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

	North Pond	South Pond
60% Design Storage Capacity	.34 A.F. at 7351.0 ft.	.19 A.F. at 7322.3 ft.
100% Sediment Capacity	.56 A.F. at 7354.83 ft.	.32 A.F. at 7325.33 ft.

Principle and emergency spillway elevations.

	North Pond	South Pond
Principal Spillway Elevation	7354.83	7325.33
Emergency Spillway Elevation	7363.33	7334.2

Field Information. Provide current water elevation, whether pond is discharging, type and number of

samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.

	North Pond	South Pond
Water Elevation	7351.85	Dry
Discharging	NO	NO
Inlet/Outlet Condition	Good	Good
Slope conditions	Good	Good

*See "Hydrologic Monitoring Data" report submitted to DOGM quarterly for monitoring information.

Field Evaluation. Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

	North Pond	South Pond
Sediment Volume	0.10 AF @7348 ft.	0.00 AF
Remaining Sediment6 Storage Capacity	0.24 AF	0.19 AF
Water Impounded	0.19 AF	0.04 AF

Changes, Comments,

THE COTTONWOOD MINE WAS IDLED IN 2001, SO THE ONLY WATER THAT REPORTS TO THE PONDS ARE RUN-OFF DURING A STORM EVENT. REPAIRS TO THE BASE OF THE STANDPIPE AREA WERE COMPLETED.

Qualification Statement

LICENSED PROFESSIONAL ENGINEER
9-22-15
No. 5049079-2202
MARK A. REYNOLDS
STATE OF UTAH

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: _____ **Date:** 9-22-15

Signature: _____ **Date:** _____

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 2
Permit Number	C/015/0019	**Report Date**	Dec. 17, 2015
Mine Name	Cottonwood/Wilberg		
Company Name	PacifiCorp		
Impoundment Name...	**North Pond**	**South Pond**	
Impoundment Number.			
UPDES Permit Number		UT 0022896-003A	
MSHA ID NUMBER.....	1211-UT-09-02052-02	1211-UT-09-02052-03	

IMPOUNDMENT INSPECTION

Inspection Date	Dec. 7, 2015
Inspected By	Rick Cullum/ Mark Reynolds
	4th Quarter Inspection 2015

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

North Pond: No instabilities or weaknesses observed.

South Pond: No instabilities or weaknesses observed.

Waste Rock Site Pond: No instabilities observed.

Required for an impoundment which functions as a SEDIMENTATION POND.

Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

	North Pond	South Pond
60% Design Storage Capacity	.34 A.F. at 7351.0 ft.	.19 A.F. at 7322.3 ft.
100% Sediment Capacity	.56 A.F. at 7354.83 ft.	.32 A.F. at 7325.33 ft.

Principle and emergency spillway elevations.

	North Pond	South Pond
Principal Spillway Elevation	7354.83	7325.33
Emergency Spillway Elevation	7363.33	7334.2

Field Information. Provide current water elevation, whether pond is discharging, type and number of

samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on out slopes of embankments, etc.

	North Pond	South Pond
Water Elevation	7351.55	Dry
Discharging	NO	NO
Inlet/Outlet Condition	Good	Good
Slope conditions	Good	Good

*See "Hydrologic Monitoring Data" report submitted to DOGM quarterly for monitoring information.

Field Evaluation. Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

	North Pond	South Pond
Sediment Volume	0.10 AF @7348 ft.	0.00 AF
Remaining Sediment/ Storage Capacity	0.24 AF	0.19 AF
Water Impounded	0.18 AF	0.00 AF

Changes, Comments,

THE COTTONWOOD MINE WAS IDLED IN 2001, SO THE ONLY WATER THAT REPORTS TO THE PONDS ARE RUN-OFF DURING A STORM EVENT. REPAIRS TO THE BASE OF THE STANDPIPE AREA WERE COMPLETED.

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: [signature] **Date:** 12-17-15

Signature: [signature] **Date:** 12-17-15

U.S. Department of Labor

Mine Safety and Health Administration
P O Box 25367
Denver, Colorado 80225
Coal Mine Safety and Health
District 9

DEC 15 2015

George M. Poulson
Manager of Mines
Interwest Mining Company
P.O. Box 310
Huntington, Utah 84528

RE: Cottonwood Mine, Mine ID No. 42-01944
North Sediment Pond and South Sediment Pond:
– Assignment of New Identification Numbers
– Annual Impoundment Reports

Dear Mr. Poulson:

Per Ken Fleck's request dated August 13, 2015, the subject sediment ponds have been transferred to the Cottonwood Mine. The new identification numbers assigned to the sediment ponds are:

New:		Old:	
Name:	**North Sediment Pond**	Name:	#1 Sediment Pond (North)
ID No.:	**UT09-01944-12**	ID No.:	1211-UT-09-02052-02
Mine:	**Cottonwood Mine (42-01944)**	Mine:	Hunter Prep Plant (42-02052) (formerly Cottonwood Coal Blending & Preparation Facility, 42-02052)
Name:	**South Sediment Pond**	Name:	#2 Sediment Pond (South)
ID No.:	**UT09-01944-13**	ID No.:	1211-UT-09-02052-03
Mine:	**Cottonwood Mine (42-01944)**	Mine:	Hunter Prep Plant (42-02052) (formerly Cottonwood Coal Blending & Preparation Facility, 42-02052)

Annual Subsidence Monitoring Report
East Mountain Property
2015

PACIFICORP
A MIDAMERICAN ENERGY HOLDINGS COMPANY

ENERGY WEST
MINING COMPANY
A SUBSIDIARY OF PACIFICORP

RECEIVED
DIV. OF OIL, GAS & MINING

March 2016

Interwest Mining Company

Annual Subsidence Monitoring Report

East and Trail Mountain Properties – 2015

INTRODUCTION - HISTORY

Interwest's East Mountain/Trail Mountain subsidence monitoring study is an ongoing project designed to detect, observe, and report the effects of mining-induced subsidence above the Deer Creek, Trail Mountain, Wilberg/Cottonwood, and Des-Bee-Dove Mines (see Figure 1). This is the thirty-second such annual report submitted, and covers the period between September 26, 2014 and August 20, 2015.

The initial report submitted in 1982 details the monitoring methods used in the study; therefore, they are not discussed in depth here. Energy West used aerial stereo photogrammetric survey methods and annual helicopter reconnaissance flights to monitor subsidence.

The aerial stereo photogrammetry work is contracted to a commercial mapping company. Between 1982 and 1987 the work was contracted through Intermountain Aerial Surveys. IAS established reading points on generally a 200-foot grid but adjusted the location of each point to be on easily reproducible locations. Between 1988 and 1990 the work was contracted to Maps Inc. Maps, Inc. used a 200-foot uniformly spaced grid. In 1991 the work was contracted to MapCon mapping consultants. The owners of this

company were previously employed by Intermountain Aerial Surveys and felt that better results could be obtained by using the original grid established by Intermountain Aerial Surveys.

In March, 2013, MapCon abruptly closed its office in Salt Lake City and Energy West was forced to re-bid this work out to other aerial photography companies. Aero-Graphics, of Salt Lake City, was selected to continue the subsidence survey work. The first subsidence data obtained from Aero-Graphics for 2013 had good continuity with previous subsidence surveys, and Energy West has high confidence that Aero-Graphics will continue to supply high-quality survey and subsidence data in the future.

Using the aerial photographs derived from the flight conducted on August 20, 2015, elevations were measured at 5,258 different points. These elevations were then compared with the baseline survey elevations measured from the aerial photos collected in 1980, 1986, 1987, 1994 and 2000. The difference in elevation between the original surveys and the 2015 survey constitutes the total amount of subsidence that has occurred. A reconnaissance helicopter overflight on November 24, 2015, did not reveal any new surface effects from subsidence since 2014.

Raw data is included as an appendix to this report in an Excel file called Copy of EastMtn_2015.xlsc. The aerial reconnaissance flight in November 2015 revealed no new fracturing or visible signs of subsidence in any of the other monitored areas.

Prior to PacifiCorp's acquisition of the Trail Mountain Mine from ARCO Coal Co.

in 1992, subsidence was monitored at Trail Mountain with conventional ground monuments and transit surveys. Between 1992 and 2001, when the mine was closed, photogrammetric methods were used. Longwall mining was completed in the Trail Mountain Mine in 2001, and the mine was closed shortly thereafter. Almost all of the leases containing second-mining areas at Trail Mountain were relinquished in 2009 after subsidence was determined to be substantially complete. Subsidence at Trail Mountain has been documented in previous reports.

RECENT DEVELOPMENTS

The Trail Mountain Mine and adjacent Cottonwood Leases were sold and transferred to Fossil Rock Resources, LLC, a subsidiary of Bowie Resource Partners, LLC on June 5, 2015. All leases and permits related to the Trail Mountain Mine are now administered by Fossil Rock Resources LLC, and Interwest Mining Company will no longer report on subsidence for this area.

All mining operations were halted at the Energy West Deer Creek mine on January 7, 2015. All mining equipment was removed from the mine in subsequent months, and there are no plans for future mining. On June 29, 2015, Energy West Mining Company was replaced by a new owner company, Interwest Mining Company, another subsidiary of PacifiCorp. All future work involving East Mountain subsidence will be performed by PacifiCorp/Interwest Mining Company. The East Mountain mine sites are scheduled to be

reclaimed over the next two-three years.

Interwest Mining Company will continue to monitor the East Mountain mining areas for subsidence for at least three years after the final year of mining at Deer Creek Mine (2015) to determine completeness of subsidence.

Location

Figure 2 shows the currently mined areas at the East Mountain mines that have the potential for causing mining-induced subsidence. In 2015 two areas of potential subsidence were monitored and mapped. These two areas cover the Deer Creek active longwall mining areas since 2003. In areas where subsidence has been detected, data is shown in the form of contour maps and profiles.

Lease Relinquishment and Reduction in Subsidence Monitoring

Several portions of the original mine leases have been relinquished on East and Trail Mountains, which means that subsidence in those areas has been determined to be complete enough for the relinquishment to take place. Having relinquished these areas, or in the case of Area 12, where no measurable subsidence has occurred, or since the Trail Mountain Mine sale, Interwest will no longer report on the subsidence conditions for those areas. Three of the original twenty-five areas chosen for subsidence monitoring were either incorporated into other maps (Areas 9 and 10) or not been represented on an individual

map (Area 12) due to complete lack of subsidence over time. These areas are still mentioned in the report, but are not shown on individual maps or profiles. Other areas where mining has not occurred for 5 years or more are considered to be completely subsided. They are: 1-7, 9-12, and 14-26, covering the old mine areas including Rilda Canyon Ridge. Also, all areas above the Des-Bee-Dove mines (areas 8 and 13) are considered to be completely subsided. Future lease relinquishments will result in further reduction in monitoring of the older areas.

Of the original 25 areas that have been chosen for subsidence monitoring, 2 are detailed in this report: 27 and 28. Area 27 covers the first district of Hiawatha seam longwall panels in the Mill Fork Lease, and Area 28 covers the first district of Blind Canyon seam longwall panels and the second, third, and fourth districts of Hiawatha seam panels in the Mill Fork Lease. Mining in these areas occurred from 2003 to 2015. Future lease relinquishments will result in further reduction in monitoring of the older areas.

Since June 1998, four survey points have been monitored annually for subsidence in the right fork of Rilda Canyon directly above the 5th North Mains in the Blind Canyon seam where 5th North crosses under the stream bed in the right fork (Figure HM-5). This is an area of first mining only, with longer pillars and offset crosscuts specifically designed to prevent subsidence. One of the points was lost from 2005 to 2010, but relocated in 2011. As of the last survey date in August 2015, no significant movement of any of the points has ever occurred. A tabulation of the point surveys is attached to this report.

Area 27

Deer Creek Mine Mill Fork Lease Area – 12th , 14th , 15th, 16th and 17th West Longwall Panels ("District 1")

Federal Lease UTU-88554 (formerly Mill Fork State Lease ML-48258) and the Federal Lease Extension (UTU-84285) form a large lease area to the northwest of the original Deer Creek Mine workings. Mining has ceased within this area as of the end of the 27th West Outby longwall panel. A sizeable area of dual-seam mining was completed in the central part of the lease. Overburden is very deep in the Mill Fork Lease, ranging from about 1,000 feet up to over 2,600 feet.

The first longwall mining was in the Hiawatha seam, in the deepest area, from south to north for 5 panels (12th, 14th, 15th, 16th, and 17th West) in the southern end of the Mill Fork Lease (called District 1). Only single-seam mining took place in the District 1 area.

The first longwall mining in District 1 in the Hiawatha seam took place in August of 2005. By the end of 2008, the mineable portions of five (5) panels had been completely extracted: 12th, 14th, 15th, 16th, and 17th West.

Subsidence has occurred above the combined areas of 12th through 17th West panels (District 1) as of the date of this report; just over 7 feet total (Figure 3, Profile Charts 1 and 2). Subsidence has increased in the area of the profiles to just over 5 feet.

Area 28 (Most Recent Mining Area)

Deer Creek Mine Mill Fork Lease Area – 2nd, 3rd, 4th, 5th, 6th, and 7th Left Longwall Panels (Blind Canyon Seam, District 2), 21st, 22nd, 23rd, 25th, 26th, 27th West Longwall Panels (Hiawatha Seam, Districts 2, 3, and 4)

The Mill Fork Lease UTU-88554 (changed from State Lease ML-48258 on September 1, 2011) and the Mill Fork Lease Extension (UTU-84285) form a large lease area to the northwest of the original Deer Creek Mine workings. This lease was the primary mining area for the Deer Creek Mine until the end of mining in January, 2015. A sizeable area of dual-seam mining was completed in the central part of the lease. Overburden is very deep in the Mill Fork Lease, ranging from about 1,000 feet up to over 2,600 feet. Area 28 covers the second panel "district" in the Blind Canyon seam (called District 2 South and District 2 North), just to the north of District 1 Hiawatha panels (described as Area 27) in the lease.

The first longwall mining in Mill Fork District 2 in the Blind Canyon seam took place in February of 2008 in 2nd Left panel. By the end of July, 2010, all 6 of the Blind Canyon panels were mined; 2nd, 3rd, 4th (District 2 South) 5th, 6th and 7th Left (District 2 North). Only a small portion of 4th Left panel was actually mined; the majority of the panel was left in place as a protective support barrier under the highest cover (Figure 4, Profile Charts 3 and 4). In the Hiawatha Seam, the 21st (narrow), 22nd, and 23rd West outby panels (District 2) were completely extracted in 2011 and 2012; this was the first and only dual-seam mining area in the Mill Fork Lease to be mined. 21st, 22nd, and 23rd West Outby

panels are located entirely within and below the gob shadow of the 5th, 6th, and 7th Left Blind Canyon panels. In this dual seam District 2 North area, maximum subsidence has reached just over 13 feet. A second set of profiles, Area 28 N-S #2 and Area 28 W-E #2 (Profile Charts 5 and 6), was added to better measure the subsidence in 5th, 6th, and 7th Left panels. Dual-seam longwall mining in this area began in December, 2010, with the startup of 21st West longwall panel in the Hiawatha seam. 21st West panel was probably too narrow, at 450 feet, to have contributed to the additional subsidence in this dual seam area. The addition of 22nd West Outby and 23rd West Outby panels has opened this area to critical width in both seams, creating the additional subsidence down to 13.1 feet.Also during 2011 and 2012, 22nd West Inby, and 23rd West Inby panels (District 3) were mined in a single-seam only mining situation. Maximum subsidence so far over this area has been approximately 7.3 feet.

During 2013 and 2014, the 25th West Inby, 26th West Inby, and 25th West Outby panels were mined, in a single-seam situation. 26th West Outby panel was not mined due to poor coal quality. 27th West Inby, and a small portion of the 27th West Outby panels were mined during 2014 in a single-seam only situation. At the time of the subsidence overflight in August 2015, 2,502 feet of the 27th West Outby panel had been mined, with the final longwall extraction at XC-32 in January, 2015. Maximum subsidence in the 25th, 26th, and 27th West Inby panels area has reached about 6.5 feet. A new pair of profile lines, shown on the Area 28 map and Charts 7 and 8, has been added to Area 28 to portray the subsidence

in this new mining area. No appreciable subsidence occurred above the 25th West Outby and 27th West Outby panels as of the time of the 2015 survey, due to their single-panel configurations.

Reasons for less than expected subsidence and inconsistent profiles even in the dual seam mining area from year to year may include: irregular mining pattern, very thick overburden, up to 2,600 feet, abundant clay strata in the upper formations, especially the North Horn formation, very steep topography, and heavy forest cover, which decrease monitoring point accuracy.

Predicted Maximum Subsidence

A comparison between observed and predicted maximum subsidence for the various areas on Energy West's property has been made using a method developed by the British National Coal Board (NCB). The NCB method utilizes graphs compiled from numerous field observations and takes into consideration the length and width of the mined-out area, thickness of coal extracted, and depth of cover. The method is claimed to be correct to ±10% in the majority of cases, assuming certain limiting conditions are met. The table below compares predicted maximum subsidence with observed subsidence for areas on East Mountain.

Area	**Subsidence (feet)**		
	Predicted Maximum	**Observed**	**% of Predicted**
1* DC 9E/W 1R	15.2	28.0	184
2 DC 5-8E/W, 3-13R	13.8	13.1	95
3 DC 1N Area	7.7	5.5	71
4 DC 2-17R	13.6	13.5	99
5 DC 2-5L	13.5	15.5	114
6 W 1-2W	5.0	4.5	90
7 Beehive 2N off 8W	6.6	7.4	112
8 Bee/Des E&W Sections	6.8	4.8	104
9 Little Dove 1N	4.3	3.5	81
10 Old American Fuel Mine	7.0	6.1	87

Area	Subsidence (feet)		
	Predicted Maximum	Observed	% of Predicted
11 DC C&D N	13.7	13.2	96
12 W 2L	1.5	0.0	0
13 Des-Bee-Dove Southern Areas	2.0	1.8	90
14 Cottonwood 6-7E	7.6	4.7	62
15 Cottonwood 9-12W	7.2	5.0	69
16 Cottonwood 8-11E	7.4	4.5	61
17 Cottonwood 16-15 W	8.1	7.2	89
18 Deer Creek 2nd-7th R	7.7	7.2	94
19 Deer Creek 7th & 8th E	7.9	4.5	57
20 Deer Creek 1st & 2nd L	7.8	6.1	79
21 Deer Creek 2nd- 7th E	7.5	7.5	100
22 Deer Creek 2nd-8th W	7.5	8.1	108
23 Trail Mountain 2nd-5th E	7.8	8.1	104
24 Trail Mountain 1st - 10th Right	7.5	7.0	93
25 Deer Cr. 8-15th East B.C. Seam	8.6	7.5	87
25 Deer Cr. N. Rilda Both Seams	17.1	17.1	100
26 Deer Cr. 1,2,3L B.C. Seam	7.1	8.4	118
26 Deer Cr. 2nd West BC Seam	3.2	3.0	94
27 Deer Cr. Mill Fork 12-16W Hia.	7.6	7.2	95
28 Deer Cr. Mill Fork 2 – 7L B.C., 21W, 22W, 23W Hia.–Dual Seam	16	13.1	82

* This area does not fit the NCB prediction model.

In most areas subsidence is less than the maximum predicted by the NCB model. Excluding Area 12, the average of the areas measured is 93.6% of the predicted values for those areas. The observed subsidence shown here represents the actual maximum subsidence for the particular geologic conditions - probably the case in some areas since subsidence appears to have ceased in several areas where the NCB predicted maxima were not reached. In areas showing greater than expected subsidence, chain pillars or barriers between sections are probably crushing so that strata above the workings cave as it would if a wider zone had been mined.

Mitigation of Surface Effects

Prior to mining in an area, Energy West notified land owners that mining was to begin beneath their properties. The land owners within the permit boundaries were as follows:

Karl A. Seely, Inc.

LDS Church

USDA Forest Service

Elk Springs Property Users Association

Kent Barton

PacifiCorp

State of Utah Institutional Trust Lands Administration

McKinnon Estate

Lavar Jensen & Phyllis Jensen

Over most areas where subsidence has been observed on East Mountain, present land use has not been affected in any way. Areas 2, 5, 6, 8, 9, 10, 12, 13, 15, 16, 17, 18, 19, 20, 23, 24, and 26 are good examples of subsidence without visible surface disturbance or adverse hydrologic effects. In such areas no mitigation is necessary.

In a few areas, such as Areas 1, 3, 4, 7, 10, 11, 14, 21 and 22, 24, and 25, surface fractures were detected. In order to protect livestock PacifiCorp erected a fence around

Area 1 (since removed) where fractures are of sufficient magnitude to pose a threat to wandering cattle. In the regions where the fractures could be reclaimed they have been filled in with heavy equipment and the escarpments have been evenly contoured and reseeded. In Area 4, the small tension fractures that formed were reclaimed by filling in the fractures using a motor-grader and reseeding the area. In Area 14, where cracks were also observed, these were filled in by hand in 1998 and reseeded. The U. S. D. A. Forest Service accepted this mitigation as being sufficient and complete. In area 25, a large fracture above the Castlegate Sandstone was filled and reclaimed to prevent hazardous conditions at the surface.

In Areas 3, 7, 10, 11, 21, 22, 24, and 25, where only minor fracturing has occurred on remote ridges and/or where land use has not been affected, more damage would be done by gaining access to and repairing or fencing fractures than can be justified. Therefore, mitigation is counterproductive in those areas and is not planned.

Summary

As of August 2015, PacifiCorp/Interwest has identified two (2) areas for continuing study of mining-induced subsidence on East Mountain. There have been no significant changes in subsidence from 2014 to 2015, due to the cessation of all mining activities in January, 2015. No surface structures, springs or raptor nests were known to be impacted by subsidence.

Terrain in the subsidence study areas ranges from relatively flat mountain tops with thick overburden of up to 2,600 feet to steep slopes and cliffs with overburden of less than 800 feet. The mine plan for the 2 study areas was designed to avoid cliff areas with second mining or 2-seam second mining. Second mining areas were kept outside of a 15 degree angle of draw from any Castlegate Sandstone cliff areas. This generally corresponded to 1,000 feet of overburden or greater above the projected second mining areas.

In areas where overburden was thicker and other more clay-rich formations such as the Upper Price River and North Horn formations were present above the mine workings, longwall and room-and-pillar mining methods allowed the multiple seam mining of large quantities of coal without apparent impact on the surface environment because the overburden yielded through plastic deformation. More than eighty percent (80%) of the East Mountain property has conditions similar to those areas; therefore, the mining methods being utilized were well suited to the geologic conditions, allowing subsidence to occur without impacting the hydrology or present land use of the area.

An effort was made again this year to predict maximum possible subsidence for the various areas where subsidence has been detected. The prediction was then compared with observed subsidence for each area. It appears that the actual subsidence occurring on East Mountain is slightly less than that predicted by the NCB model.

Professional Certification of Subsidence Data

I, Kenneth S. Fleck, being a Licensed Professional Geologist in the State of Utah (#5224883-2250, Exp. 3/31/17), with significant experience in subsidence monitoring, certify that the subsidence data contained in this document was collected under my direction, and the attached subsidence materials were prepared by me using industry-accepted methods. I further certify that the interpretations contained herein are an accurate representation of the subsidence that has occurred.

Dated this 31st day of March 2016.

Kenneth S. Fleck

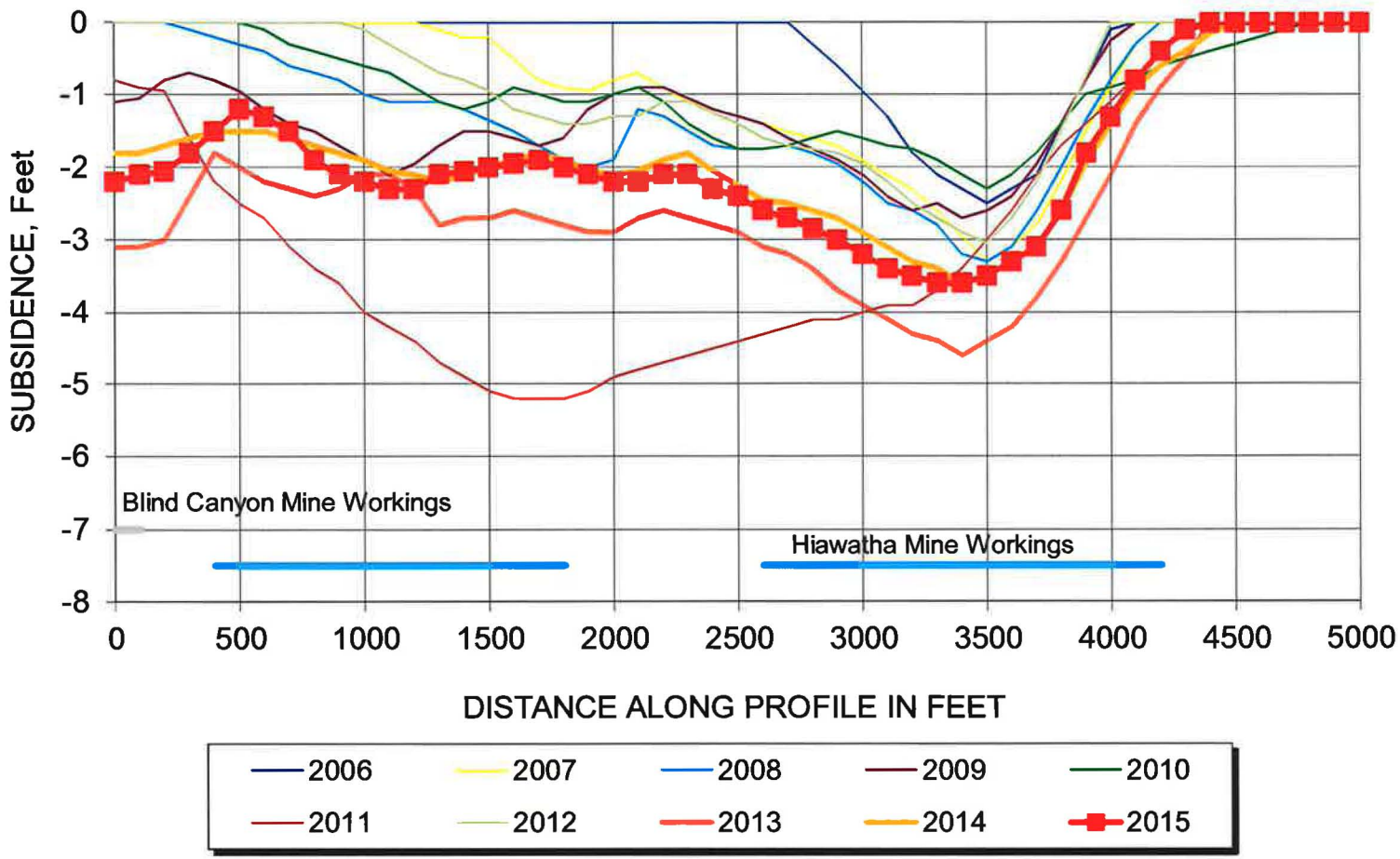
Kenneth S. Fleck

Professional Geologist

License No. 5224883-2250

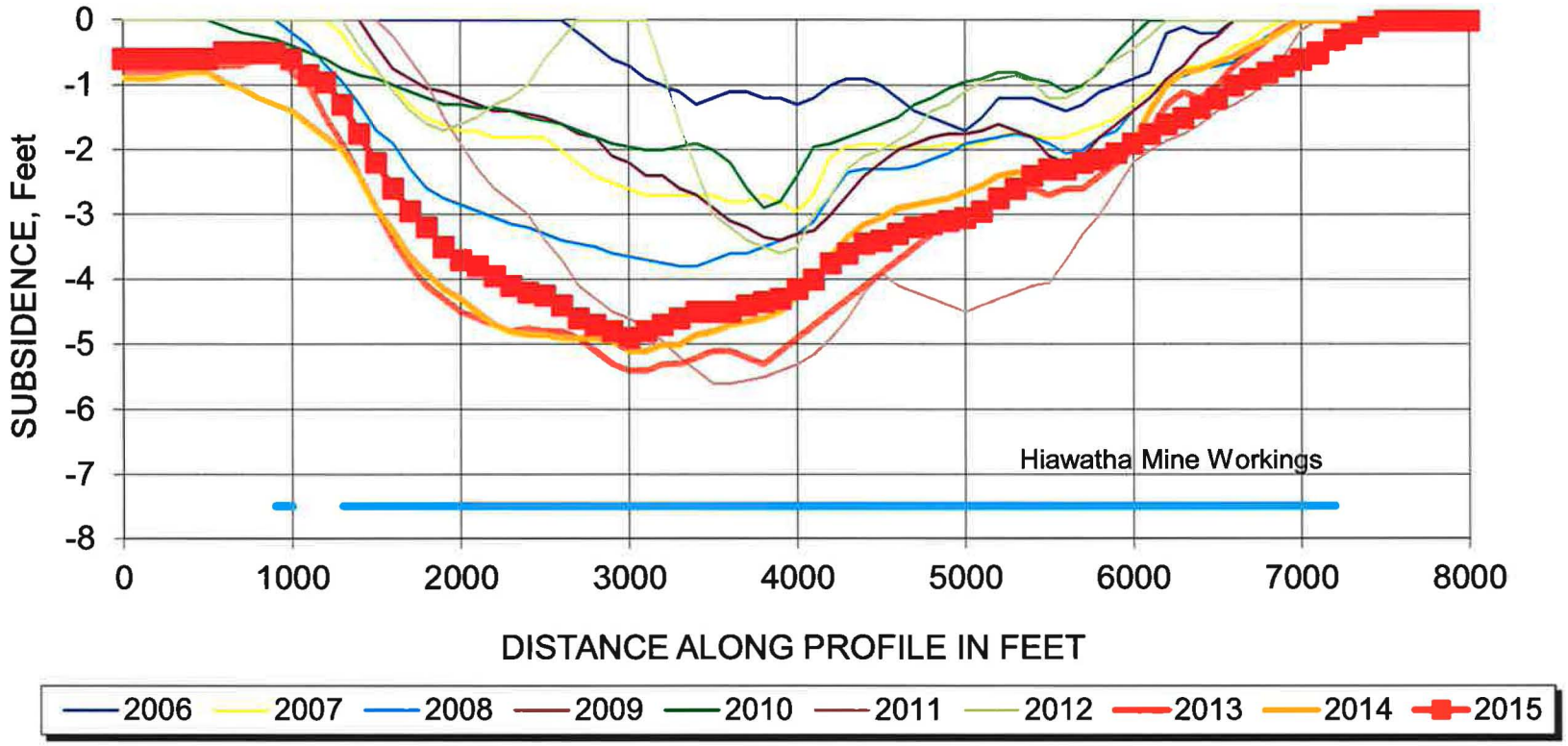
Energy West 2015 Subsidence Report
Area 27 Subsidence Profile (Mill Fork Area)
North-South

Chart 1



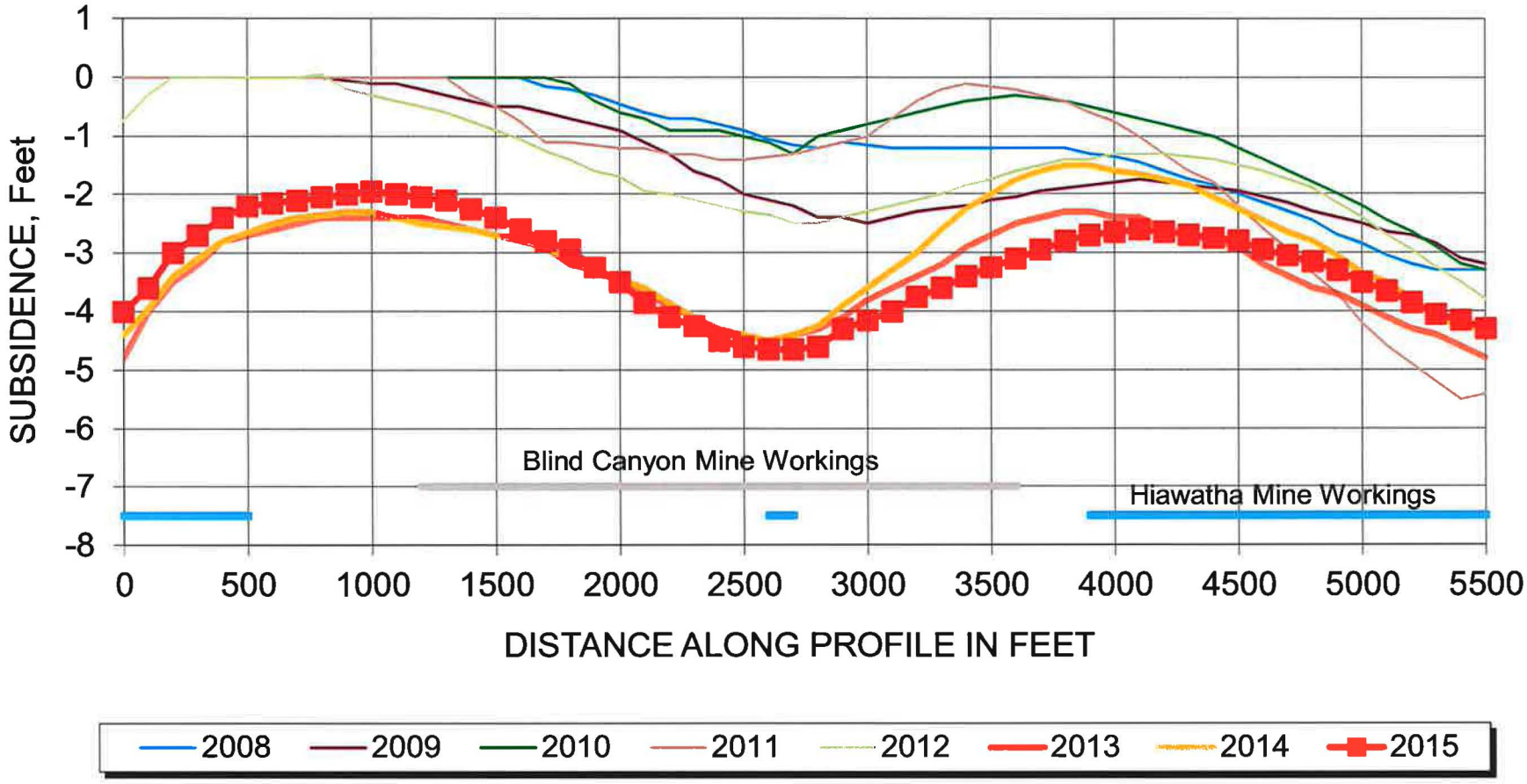
Energy West 2015 Subsidence Report
Area 27 Subsidence Profile (Mill Fork Area)
West-East

Chart 2



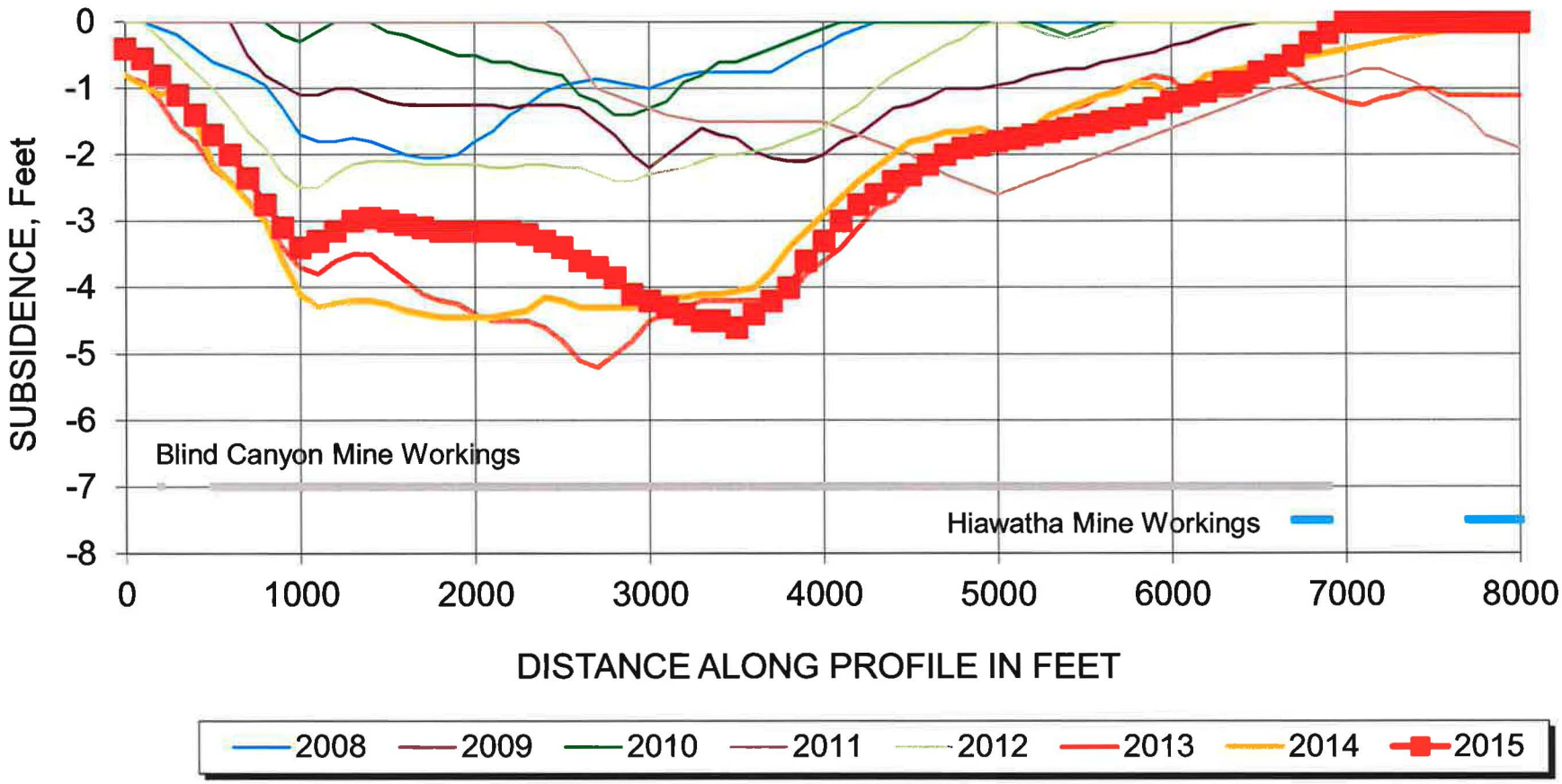
Energy West 2015 Subsidence Report
Area 28 Subsidence Profile(Mill Fork Area)
North-South #1

Chart 3



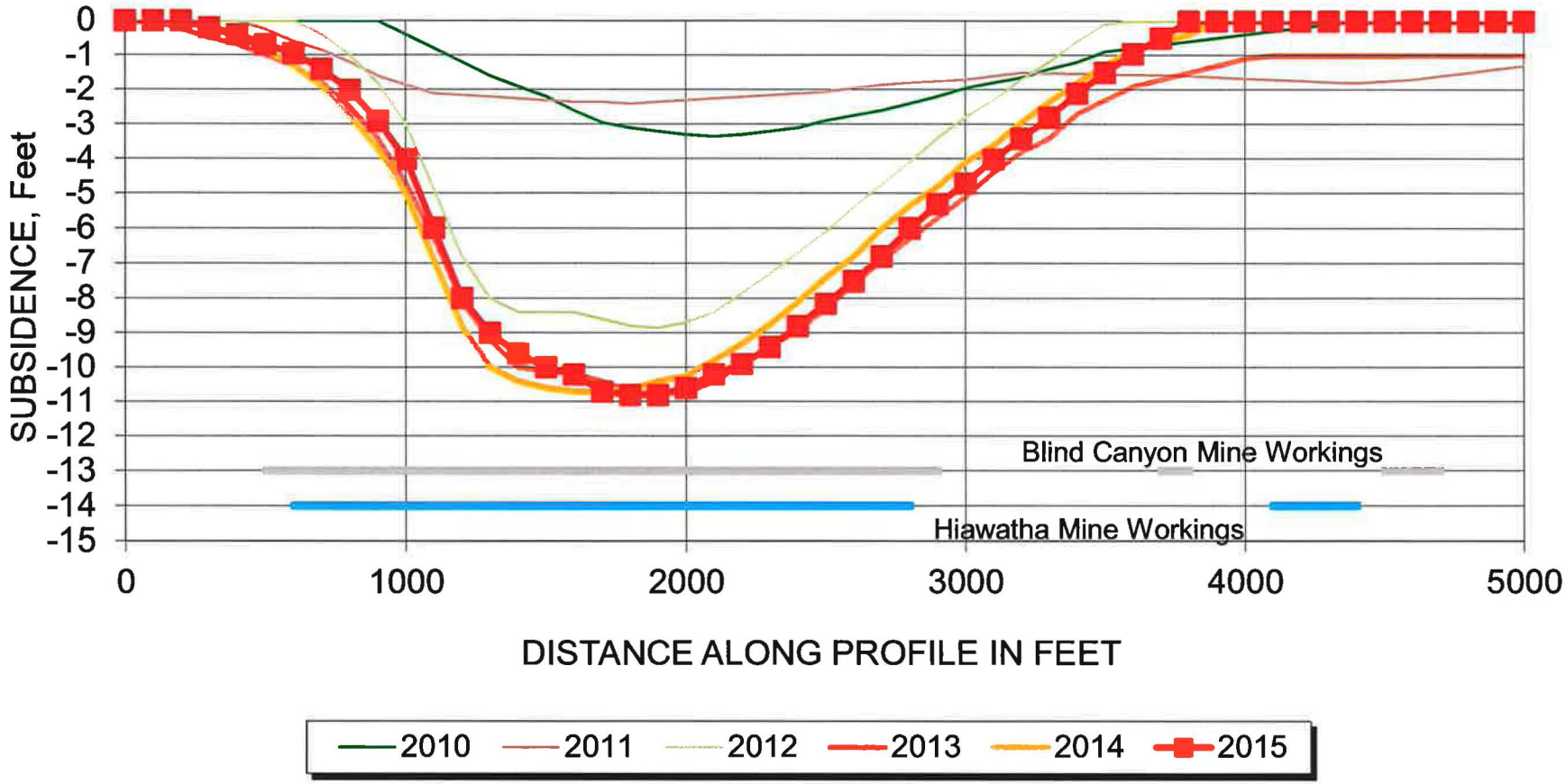
Energy West 2015 Subsidence Report
Area 28 Subsidence Profile (Mill Fork Area)
West-East #1

Chart 4



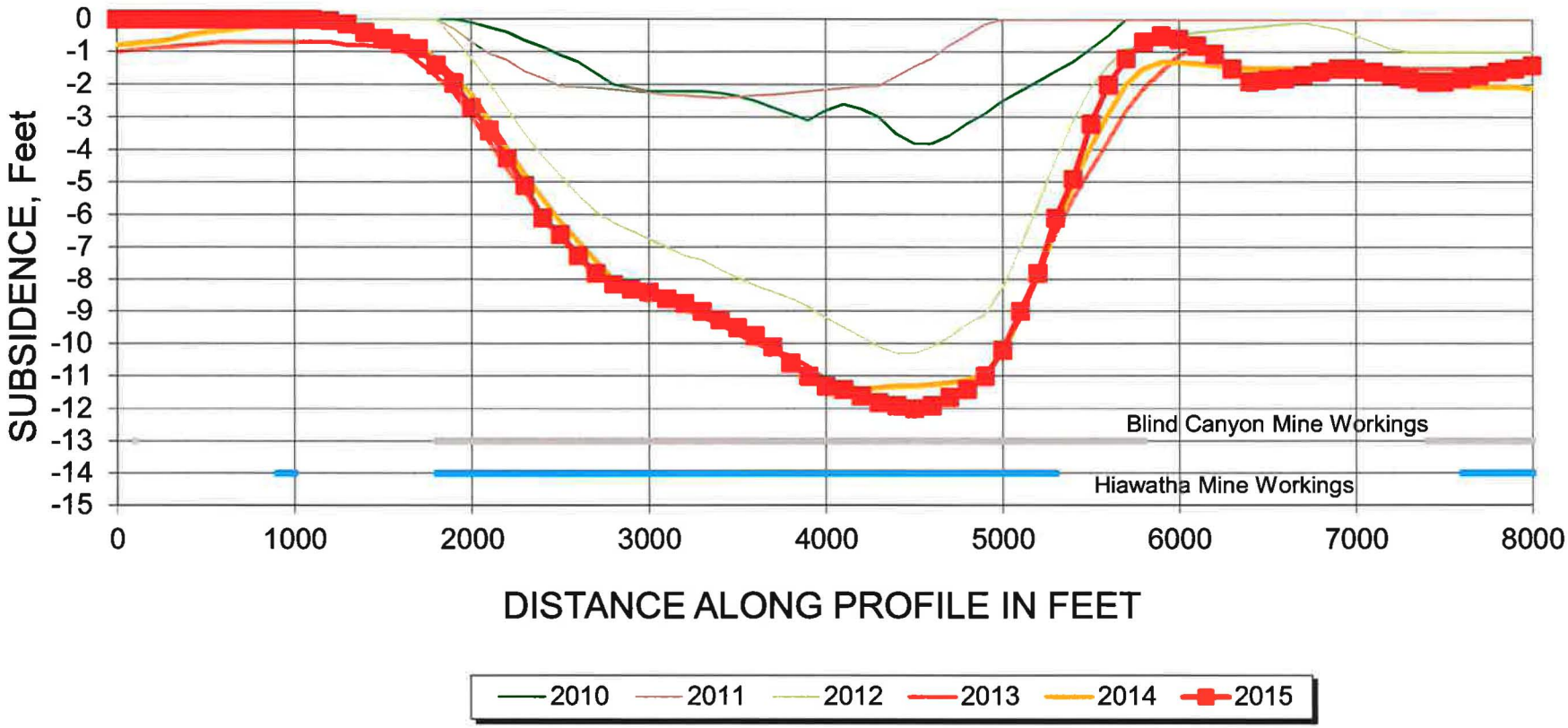
Energy West 2015 Subsidence Report
Area 28 Subsidence Profile (Mill Fork Area)
North-South #2

Chart 5



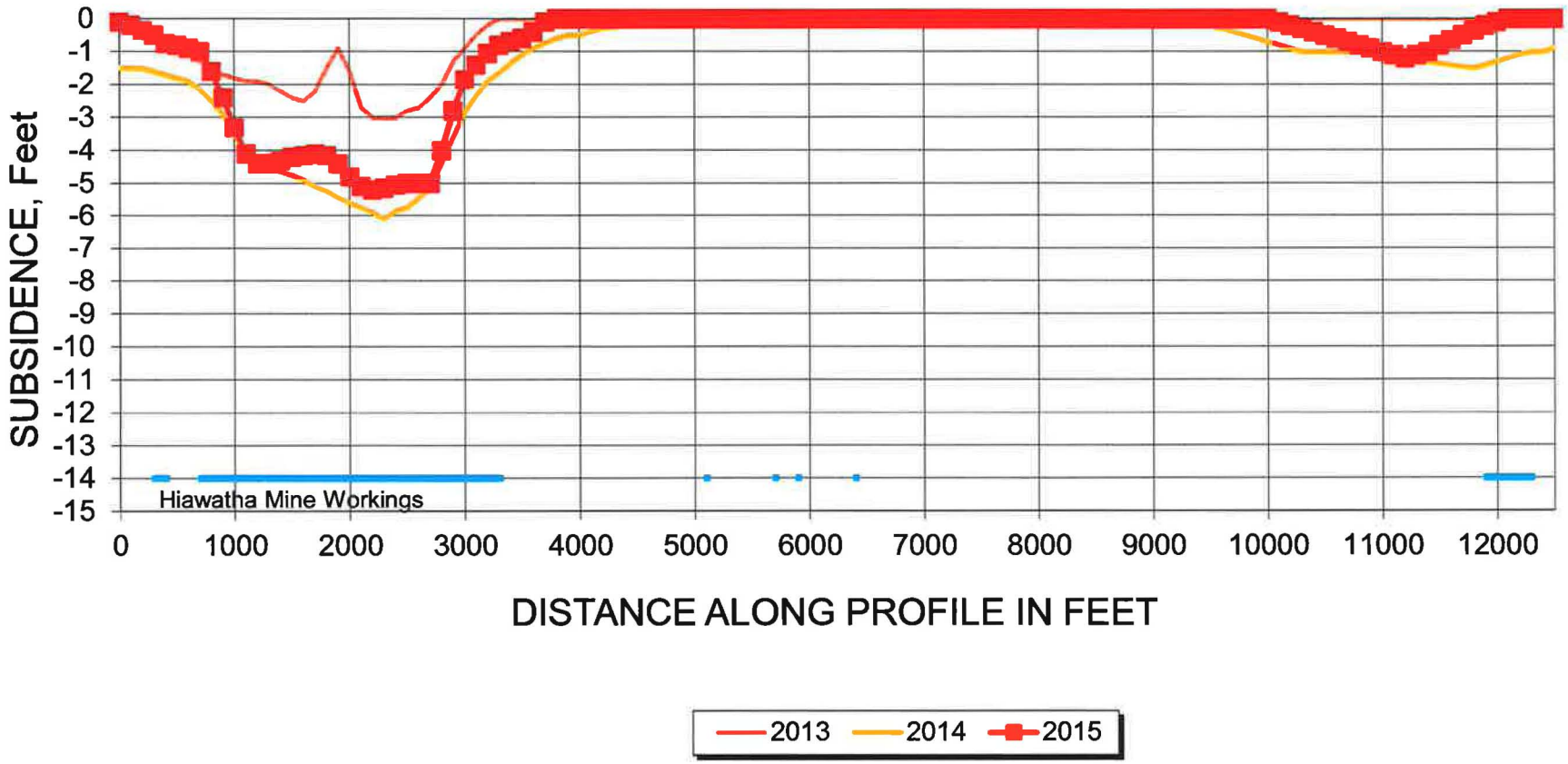
Energy West 2015 Subsidence Report
Area 28 Subsidence Profile (Mill Fork Area)
West - East #2

Chart 6



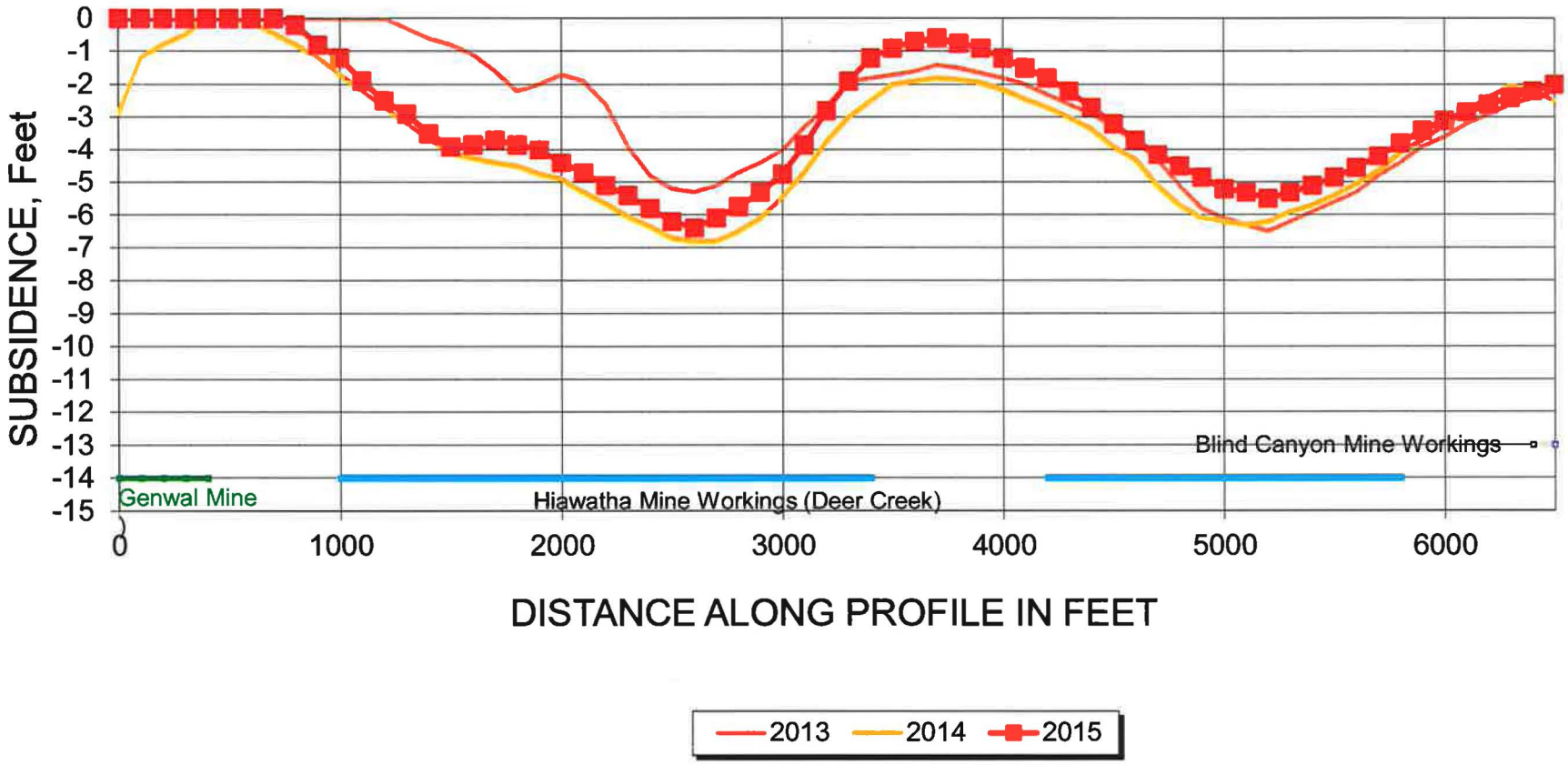
Energy West 2015 Subsidence Report
Area 28 Subsidence Profile (Mill Fork Area)
West - East #3

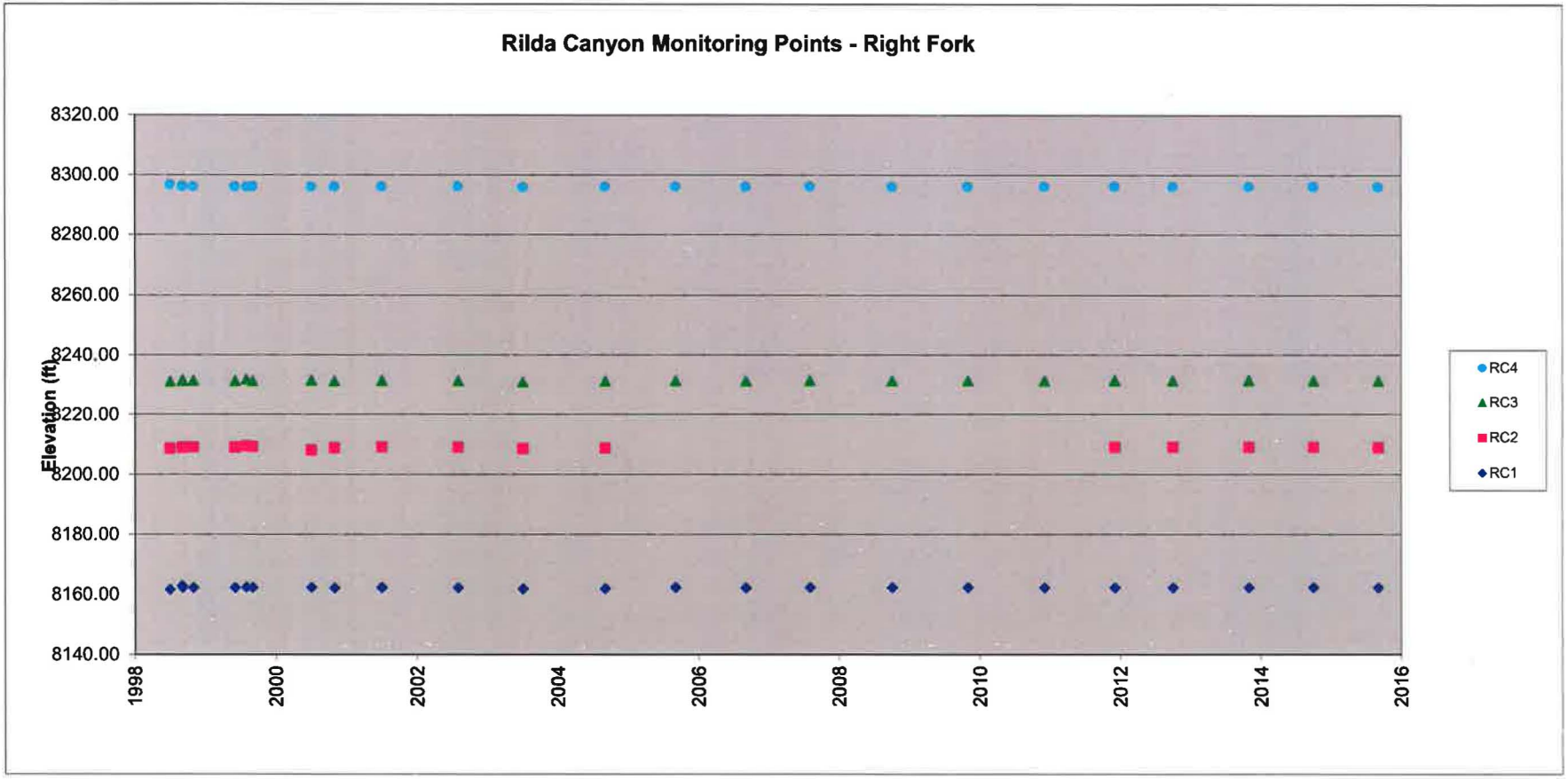
Chart 7

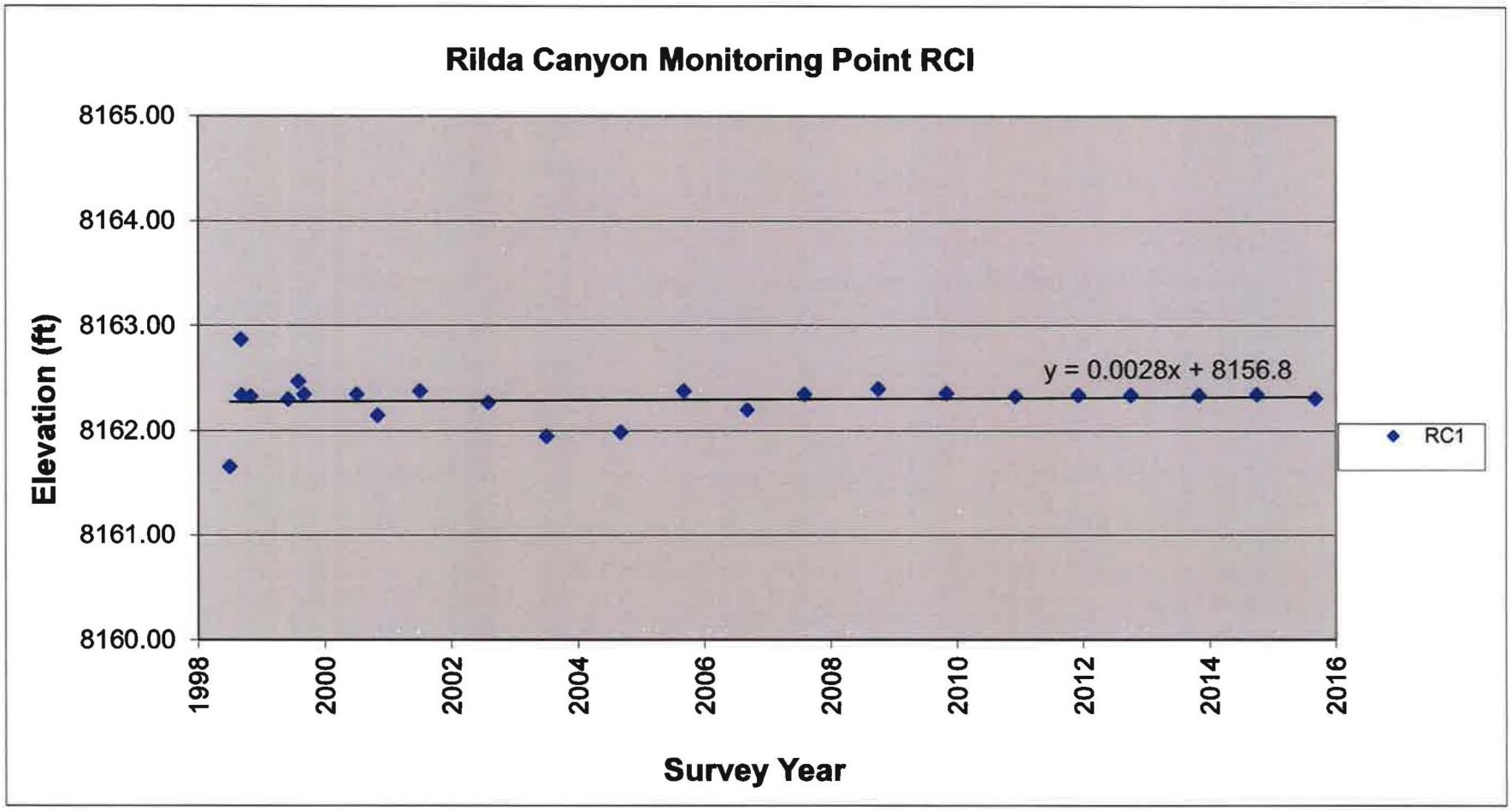


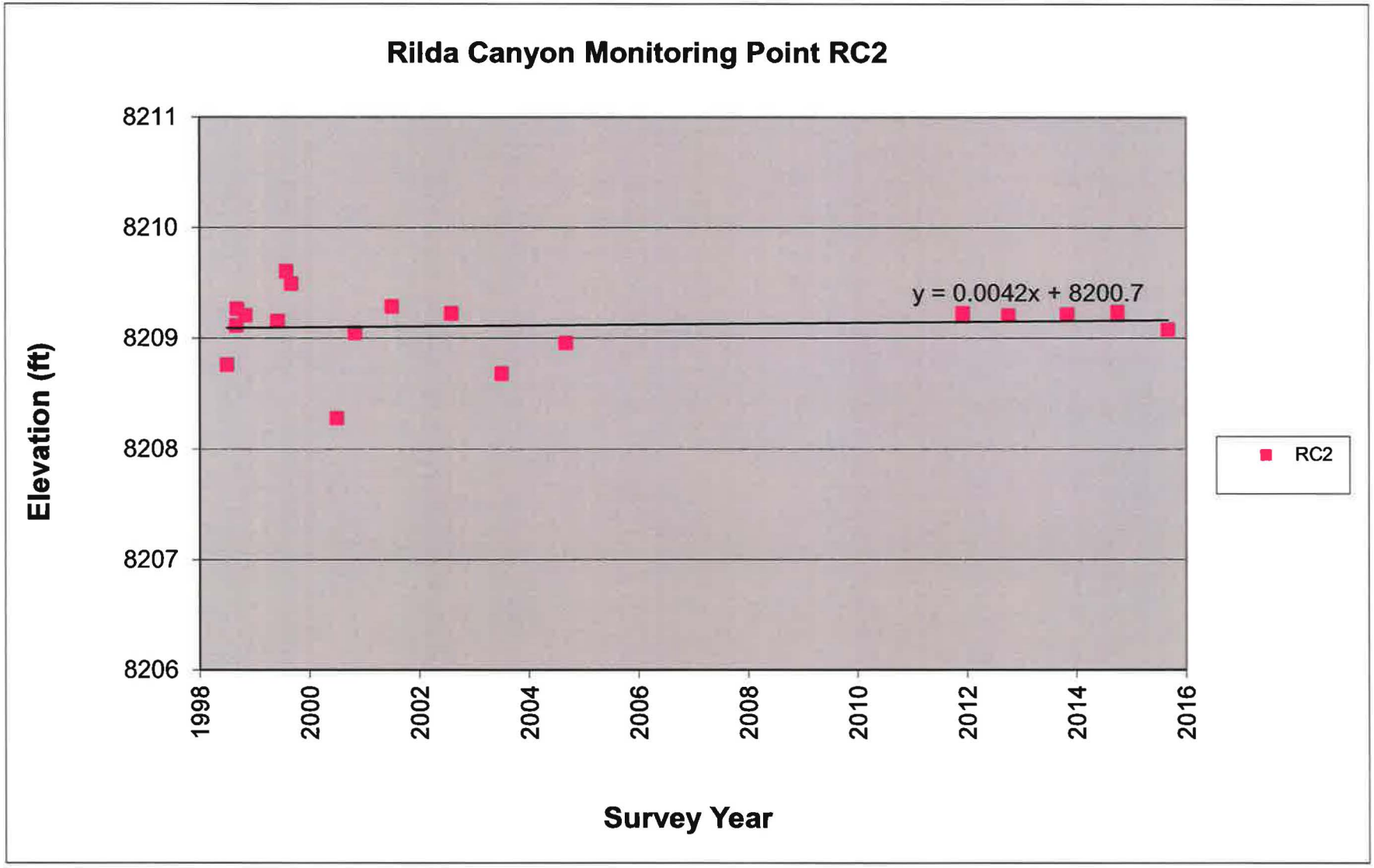
Energy West 2015 Subsidence Report
Area 28 Subsidence Profile (Mill Fork Area)
North - South #3

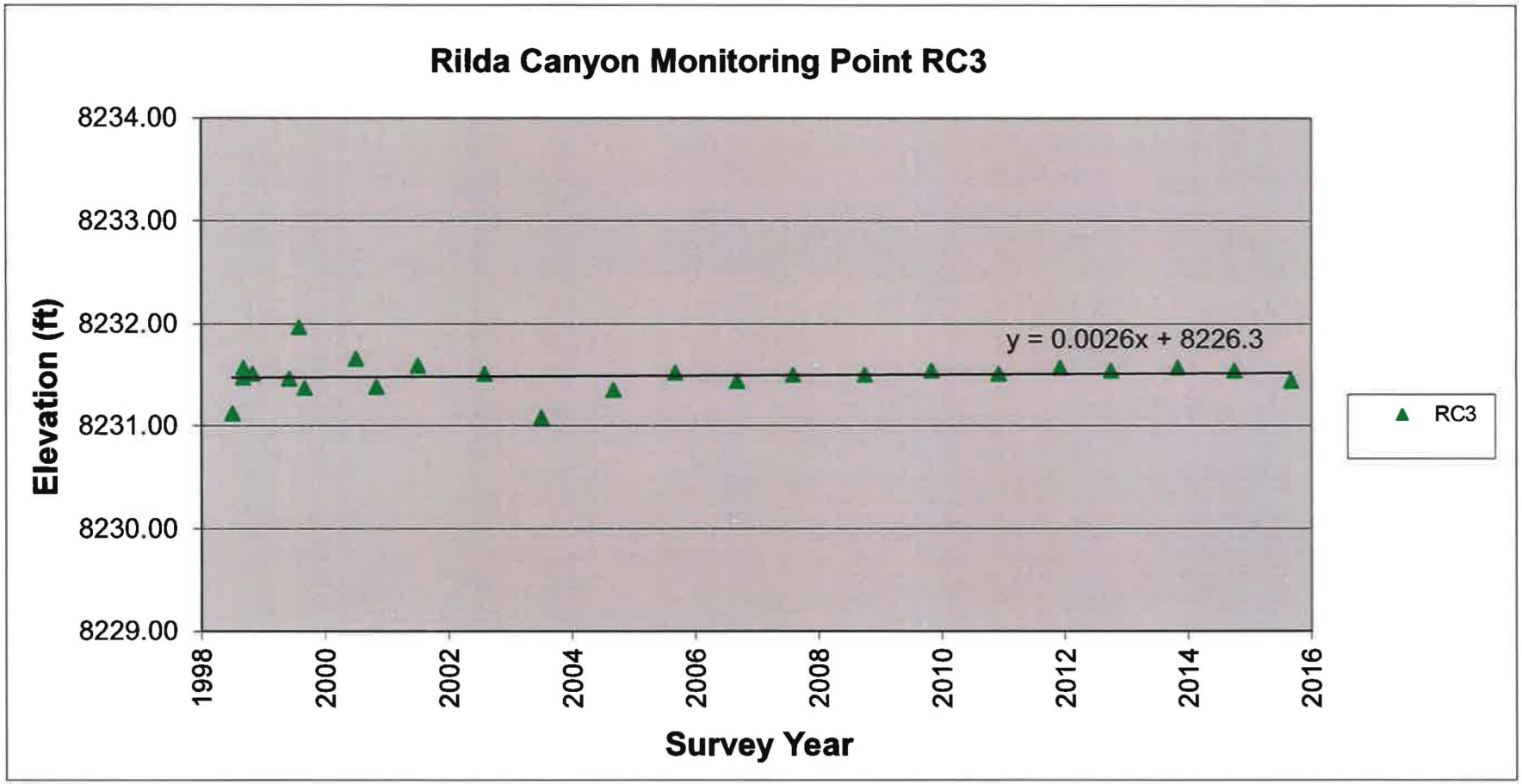
Chart 8

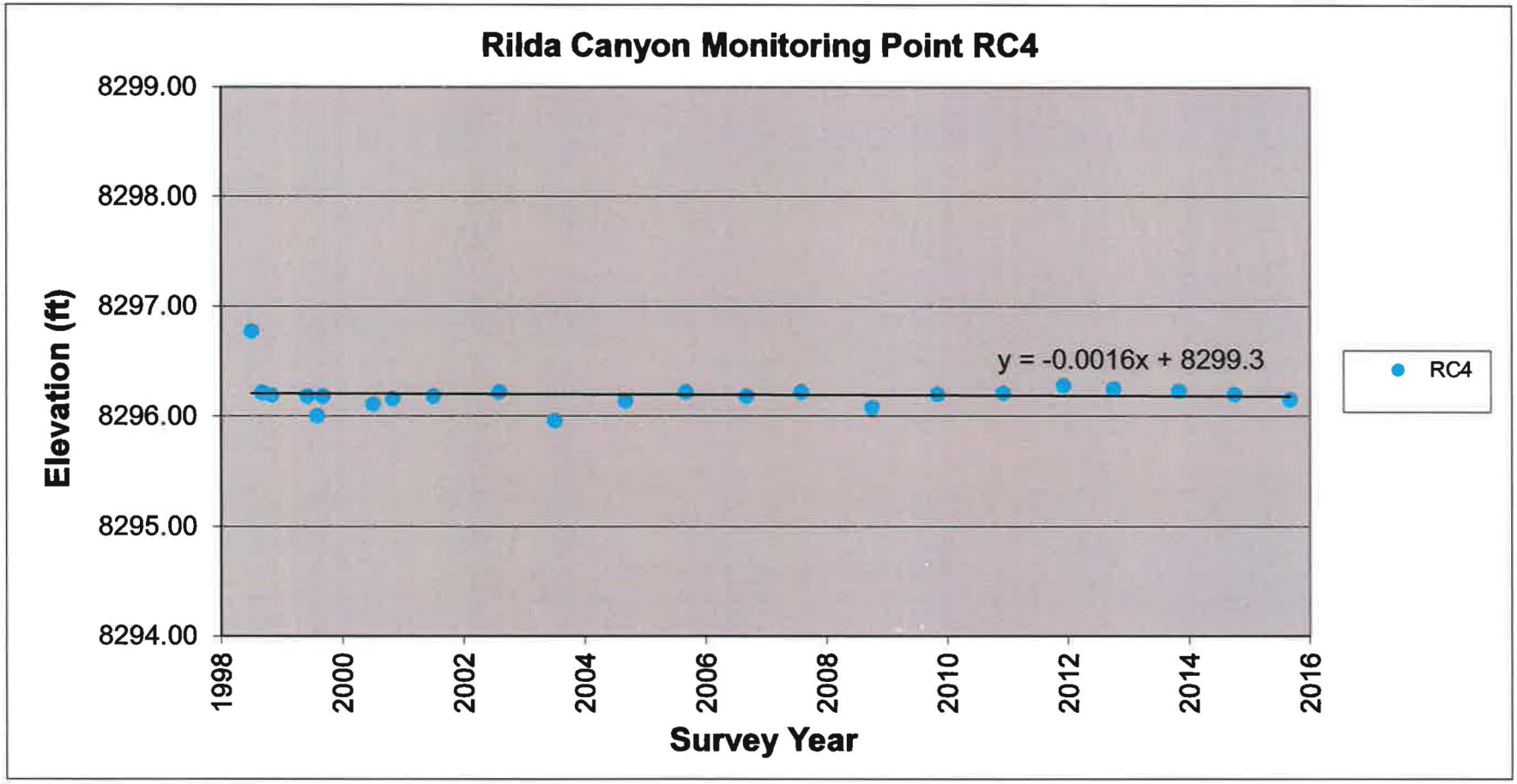



Rilda Canyon Monitoring Points - Right Fork
Elevation (ft)
8320.00
8300.00
8280.00
8260.00
8240.00
8220.00
8200.00
8180.00
8160.00
8140.00
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
RC4
RC3
RC2
RC1

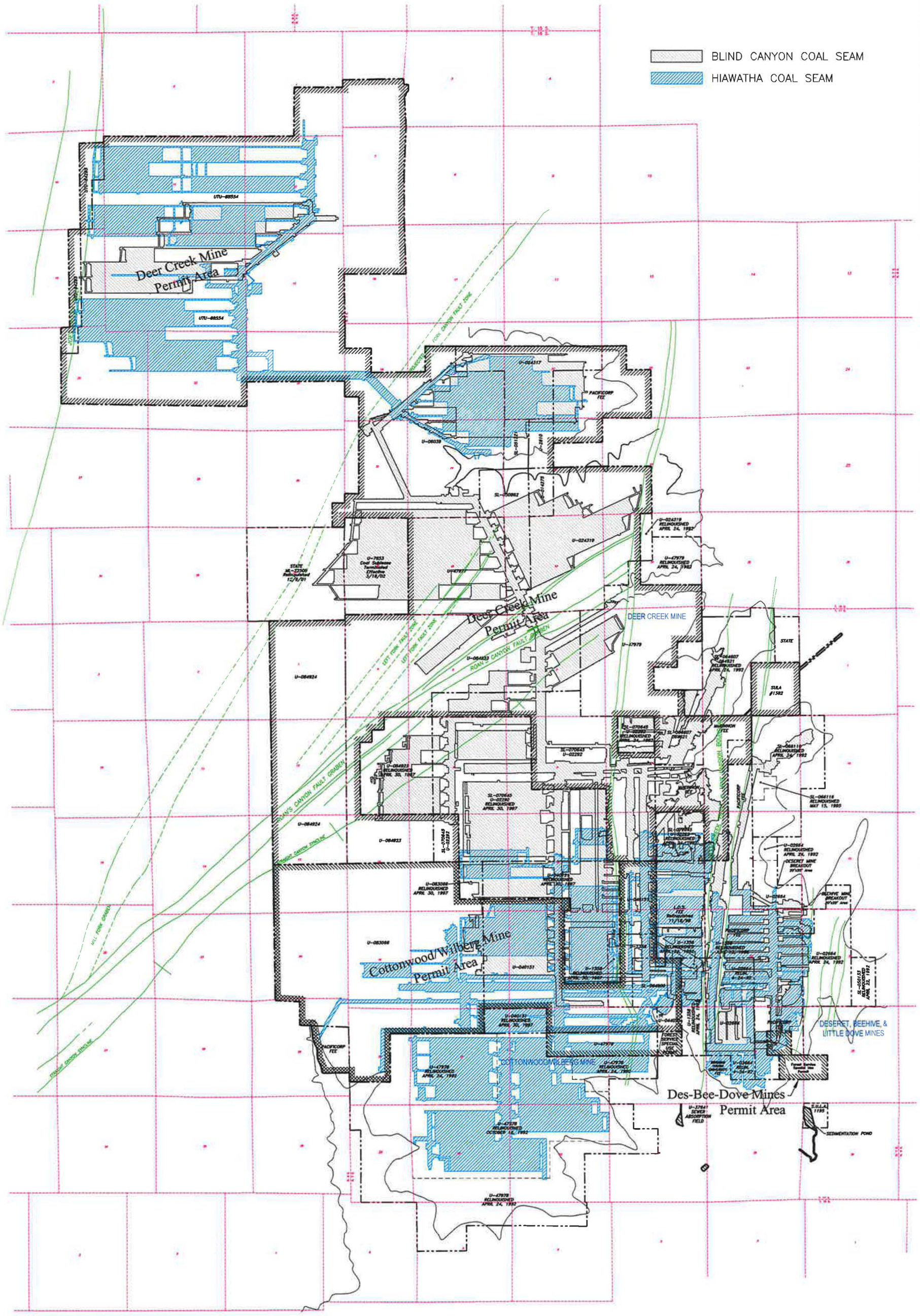

Rilda Canyon Monitoring Point RCI
8165.00
8164.00
8163.00
8162.00
8161.00
8160.00
Elevation (ft)
y = 0.0028x + 8156.8
RC1
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
Survey Year


Rilda Canyon Monitoring Point RC2
Elevation (ft)
8211
8210
8209
8208
8207
8206
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
Survey Year
y = 0.0042x + 8200.7
RC2


Rilda Canyon Monitoring Point RC3
8234.00
8233.00
8232.00
8231.00
8230.00
8229.00
Elevation (ft)
y = 0.0026x + 8226.3
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
Survey Year
RC3


Rilda Canyon Monitoring Point RC4
Elevation (ft)
8299.00
8298.00
8297.00
8296.00
8295.00
8294.00
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
Survey Year
y = -0.0016x + 8299.3
RC4

				RILDA CANYON SURFACE MONITORING ABOVE 5TH NORTH								
		RC1			RC2			RC3			RC4	
		btm end									top end	
DATE	N	E	ELEV.	N	E	ELEV.	N	E	ELEV.	N	E	ELEV.
6/25/1998	392182.74	2093512.40	8161.66	392322.12	2092965.04	8208.76	392421.14	2092750.95	8231.12	392536.81	2092275.45	8296.77
8/12/1998	392184.17	2093512.37	8162.87	392322.95	2092965.38	8209.12	392421.69	2092751.06	8231.47	392536.82	2092275.43	8296.21
8/14/1998			8162.34			8209.27			8231.57			8296.22
10/1/1998			8162.33			8209.21			8231.51			8296.19
5/26/1999			8162.30			8209.16			8231.46			8296.18
7/6/1999			8162.47			8209.61			8231.97			8296.00
8/25/1999			8162.35			8209.50			8231.37			8296.18
6/23/2000			8162.35			8208.28			8231.66			8296.11
10/17/2000			8162.15			8209.05			8231.38			8296.16
6/5/2001			8162.38			8209.29			8231.59			8296.18
7/9/2002			8162.27			8209.23			8231.51			8296.22
5/28/2003			8161.95			8208.68			8231.08			8295.96
7/26/2004			8161.99			8208.96			8231.35			8296.14
7/22/2005			8162.38						8231.52			8296.22
7/17/2006			8162.20						8231.44			8296.18
7/5/2007			8162.35						8231.50			8296.22
8/26/2008			8162.40						8231.50			8296.08
9/21/2009			8162.36						8231.54			8296.20
11/2/2010			8162.33						8231.51			8296.21
10/24/2011			8162.34			8209.23			8231.57			8296.28
8/24/2012			8162.34			8209.21			8231.54			8296.25
9/24/2013			8162.34			8209.22			8231.57			8296.23
8/28/2014			8162.35			8209.24			8231.54			8296.20
8/13/2015			8162.31			8209.08			8231.44			8296.15

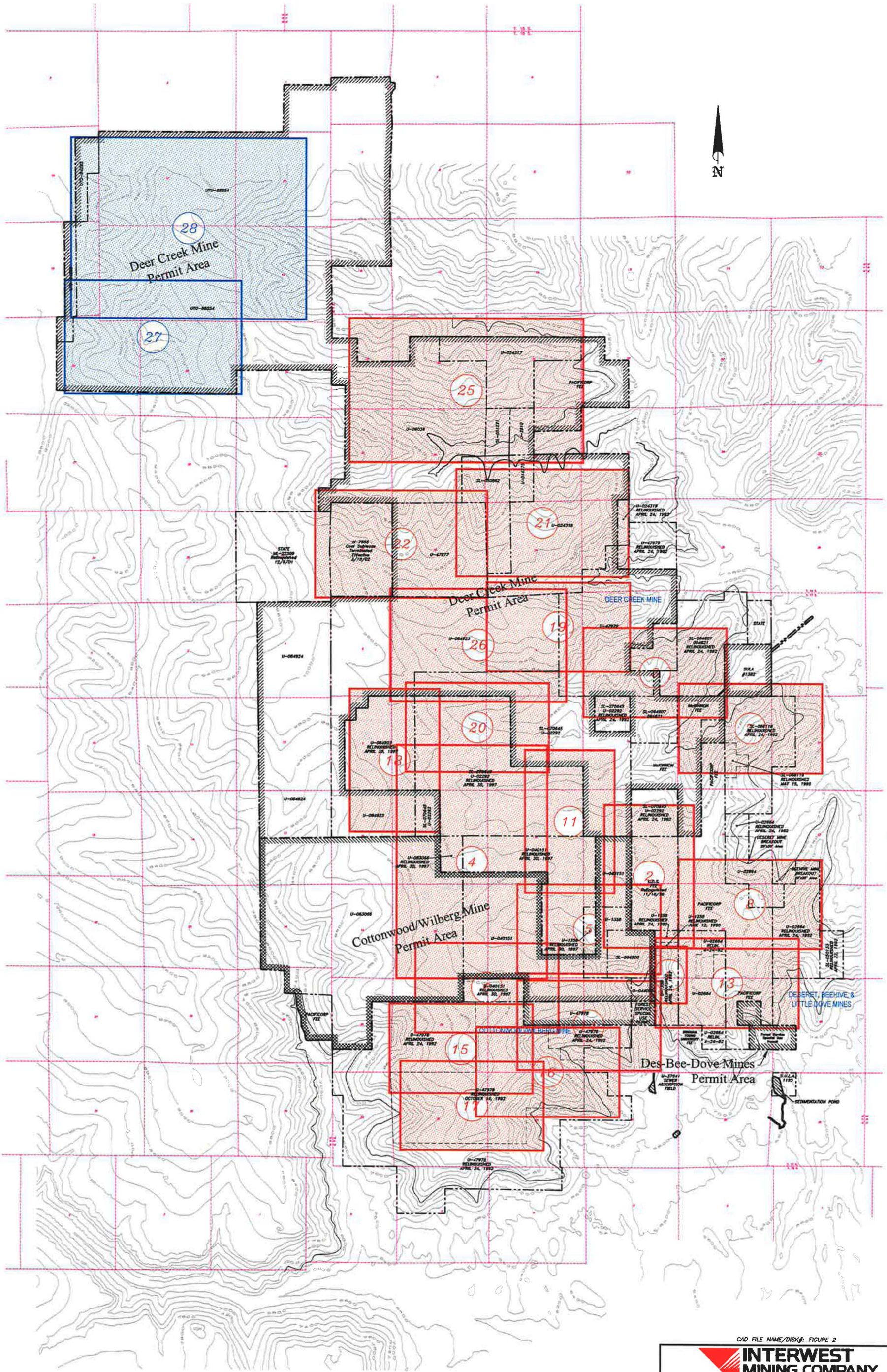


CAD FILE NAME/DISK#: FIGURE 1

INTERWEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP

EAST MOUNTAIN
MINE AREAS AS OF 1/7/2015

DRAWN BY: K. LARSEN	FIGURE 1	
SCALE: 1" = 1 MILE	DRAWING #:	
DATE: FEBRUARY 16, 2016	SHEET 1 OF 1	REV. ___



15 AREAS ELIMINATED FROM STUDY AS OF 2010

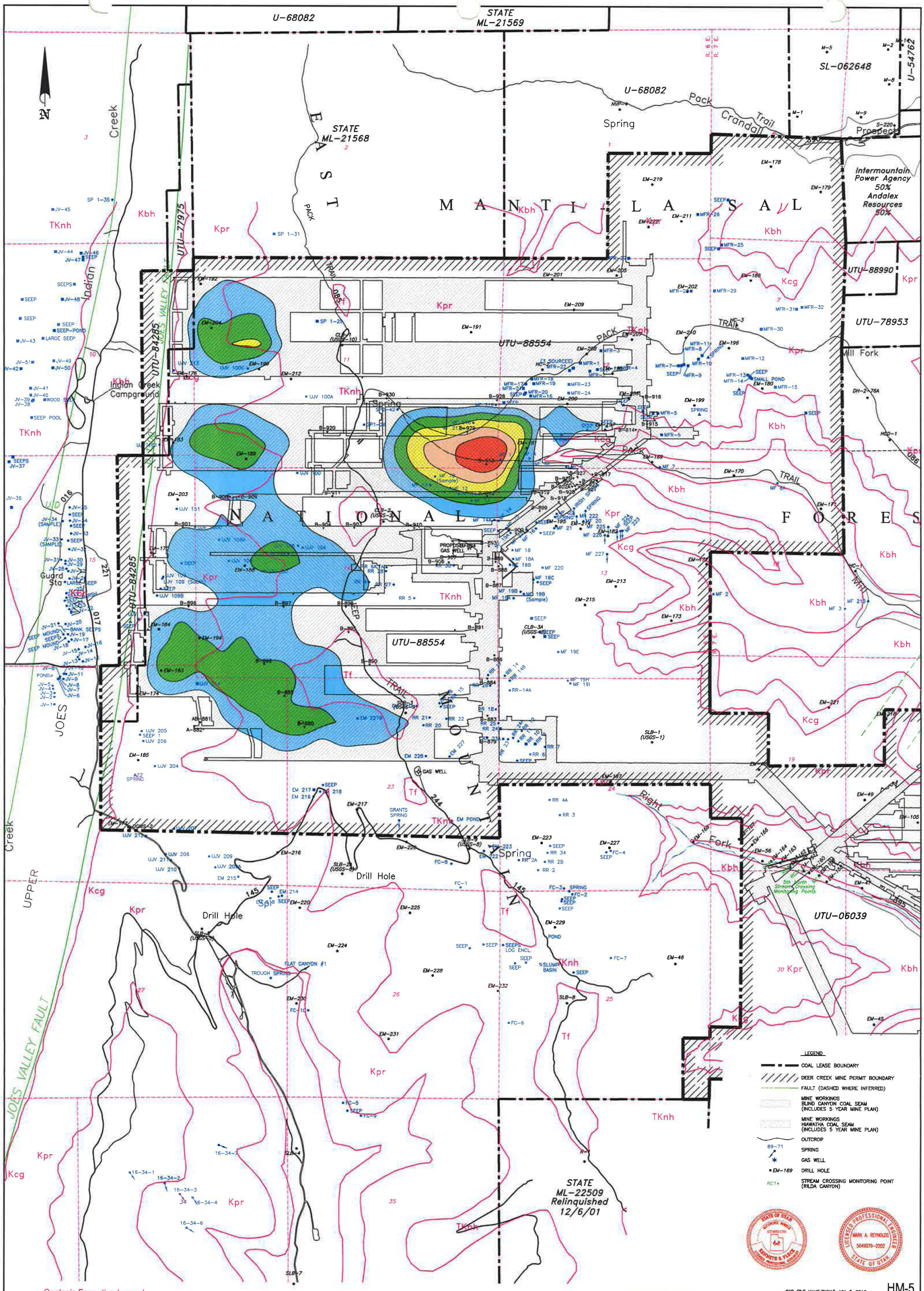
27 AREAS STUDIED FOR SUBSIDENCE NUMBERS KEYED TO TEXT

CAD FILE NAME/DISK#: FIGURE 2

INTERWEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP

2015 SUBSIDENCE MONITORING
AREAS STUDIED
FOR SUBSIDENCE

DRAWN BY: K. LARSEN	FIGURE 2	
SCALE: 1"=1 MILE	DRAWING #:	
DATE: FEBRUARY 16, 2016	SHEET 1 OF 1	REV.



Geologic Formation Legend

Qal	Alluvial Deposits (Stream bed deposits, Alluvial fans, etc.)
Tf	Flagstaff Limestone
TKn	North Horn Formation
Kpr	Upper Price River Formation
Kc	Castlegate Sandstone
Kbh	Blackhawk Formation
Ksp	Star Point Sandstone
Kmm	Mancos Shale (Masuk Member)

SUBSIDENCE LEGEND

- 2-4 FEET
- 4-6 FEET
- 6-8 FEET
- 8-10 FEET
- 10-12 FEET

CAD FILE NAME/DISK#: HM-5-2016

HM-5

INTERWEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP

SPRING MAP
EAST MOUNTAIN
AND 2015 SUBSIDENCE ZONES

DRAWN BY:	K. LARSEN	DRAWING #:	CE-10904-EM
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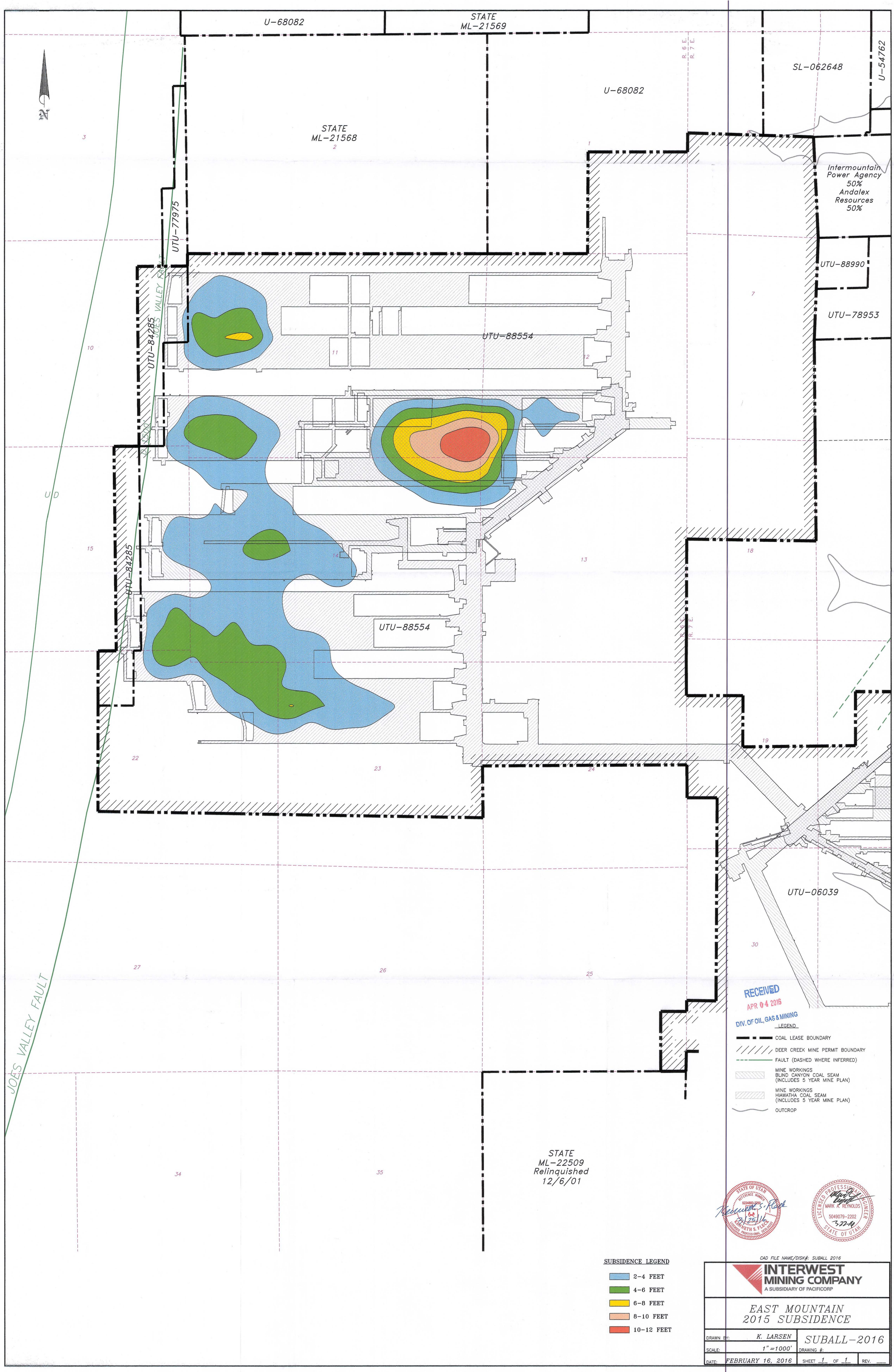
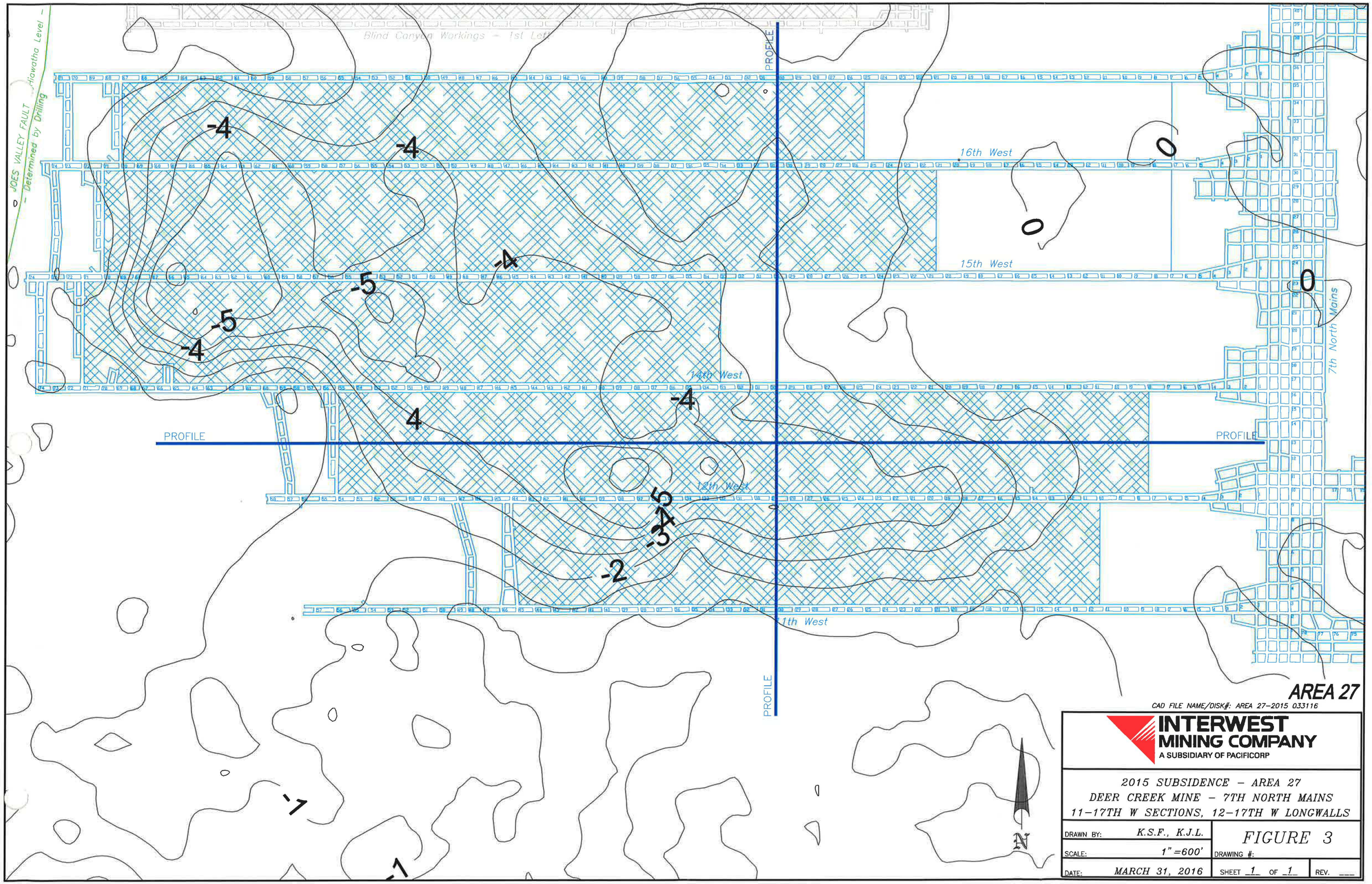
DATE:	FEBRUARY 16, 2016	SHEET 1 OF 1	REV.


U-68082
STATE ML-21569
U-68082
SL-062648
U-54762
STATE ML-21568
R. 6 E.
R. 7 E.
Intermountain Power Agency 50% Andalex Resources 50%
UTU-77975
UTU-88990
UTU-78953
UTU-84285
JOES VALLEY FAULT
UTU-88554
UTU-88554
UTU-84285
UTU-06039
STATE ML-22509 Relinquished 12/6/01
RECEIVED
APR 04 2016
DIV. OF OIL, GAS & MINING
LEGEND
COAL LEASE BOUNDARY
DEER CREEK MINE PERMIT BOUNDARY
FAULT (DASHED WHERE INFERRED)
MINE WORKINGS BLIND CANYON COAL SEAM (INCLUDES 5 YEAR MINE PLAN)
MINE WORKINGS HIAWATHA COAL SEAM (INCLUDES 5 YEAR MINE PLAN)
OUTCROP
SUBSIDENCE LEGEND
2-4 FEET
4-6 FEET
6-8 FEET
8-10 FEET
10-12 FEET
STATE OF UTAH
REFERENCE NUMBER
5224883-2250
3/25/16
KENNETH S. FLECK
LICENSED PROFESSIONAL GEOLOGIST
LICENSED PROFESSIONAL ENGINEER
MARK A. REYNOLDS
5049079-2202
3-22-16
STATE OF UTAH
CAD FILE NAME/DISK#: SUBALL 2016
INTERWEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP
EAST MOUNTAIN
2015 SUBSIDENCE
DRAWN BY: K. LARSEN
SCALE: 1"=1000'
DATE: FEBRUARY 16, 2016
SUBALL-2016
DRAWING #:
SHEET 1 OF 1
REV.



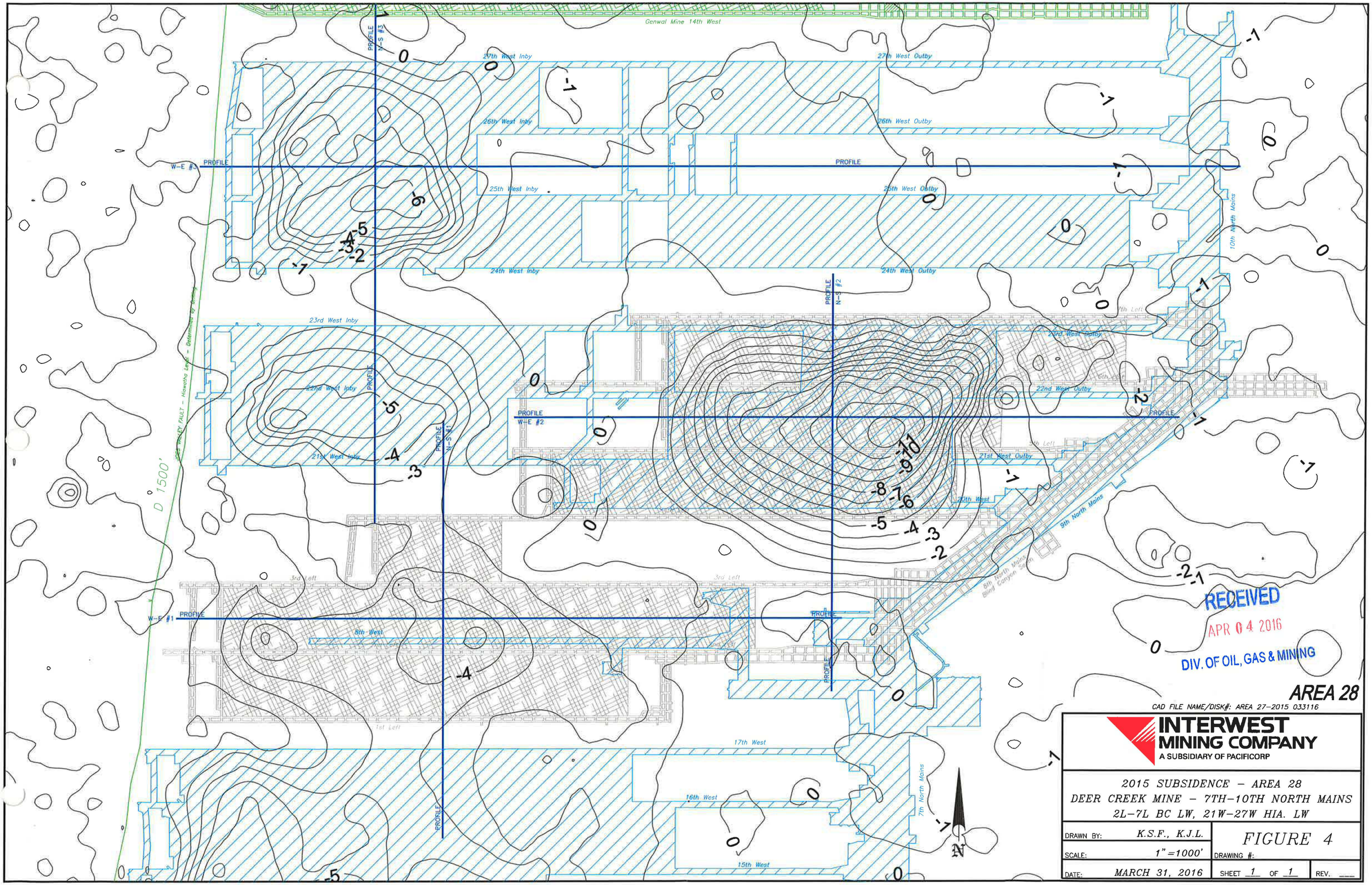
AREA 27

CAD FILE NAME/DISK#: AREA 27-2015 033116

INTERWEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP

2015 SUBSIDENCE – AREA 27
DEER CREEK MINE – 7TH NORTH MAINS
11–17TH W SECTIONS, 12–17TH W LONGWALLS

DRAWN BY: K.S.F., K.J.L.	FIGURE 3	
SCALE: 1"=600'	DRAWING #:	
DATE: MARCH 31, 2016	SHEET 1 OF 1	REV. ___


Genwal Mine 14th West
27th West Inby
27th West Outby
26th West Inby
26th West Outby
25th West Inby
25th West Outby
24th West Inby
24th West Outby
23rd West Inby
23rd West Outby
22nd West Inby
22nd West Outby
21st West Inby
21st West Outby
20th West
8th West
17th West
16th West
15th West
10th North Mains
9th North Mains
8th North Mains
7th North Mains
Bluff Canyon Slope
3rd Left
1st Left
PROFILE
W-E #3
W-E #2
W-E #1
N-S #3
N-S #2
N-S #1
D 1500'
SEE TRACY FAULT - Hiawatha Lease - Determined by Drilling
N
RECEIVED
APR 04 2016
DIV. OF OIL, GAS & MINING
AREA 28
CAD FILE NAME/DISK#: AREA 27-2015 033116
INTERWEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP
2015 SUBSIDENCE - AREA 28
DEER CREEK MINE - 7TH-10TH NORTH MAINS
2L-7L BC LW, 21W-27W HIA. LW
DRAWN BY: K.S.F., K.J.L.
SCALE: 1"=1000'
DATE: MARCH 31, 2016
FIGURE 4
DRAWING #:
SHEET 1 OF 1
REV.

PACIFICORP - INTERWEST MINING COMPANY
HYDROLOGIC MONITORING PROGRAM
ANNUAL REPORT FOR 2015

MARCH 2016

Submitted to:
Utah Division of Oil, Gas and Mining

Prepared and submitted for PacifiCorp by:

Interwest Mining Company

RECEIVED
APR 04 2016
DIV. OF OIL, GAS & MINING

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I. INTRODUCTION

The 2015 Hydrologic Monitoring Report is hereby submitted in accordance with the U.S. Department of Interior, Office of Surface Mining requirements and the Utah State Division of Oil, Gas and Mining guidelines for hydrologic monitoring in areas of and adjacent to coal mining operations.

This is the thirty-eighth annual hydrologic report submitted by PacifiCorp since the report entitled "Monitoring of the Water Resources in the Mining Areas of East/Trail Mountain, Emery County, Utah" was submitted to the U.S. Geological Survey and the Utah Division of Oil, Gas and Mining in December 1977. It addresses flow observations and water quality characteristics of the water resources adjacent to PacifiCorp's mining areas in Emery County. (See Figure 1, A & B)

Information was compiled the past year from in-house as well as from state and federal agencies and private sources as follow:

U. S. Geological Survey
U. S. Forest Service
National Oceanic and Atmospheric Administration
Utah Division of Oil, Gas and Mining
Castle Valley Special Services District
Emery Water Conservancy District
North Emery Water Users Special Services District

Information from outside agencies will continue to be utilized each year for as long as their data gathering programs continue. As a result, this cooperative effort is realized and duplication of effort and expense is substantially reduced.

II. CLIMATIC OBSERVATIONS

In general, runoff and subsequent water supplies are a direct function of the climatic conditions in any given area. Furthermore, the significance of the weather affecting the flow characteristics of the East/Trail Mountain springs cannot be over-emphasized.

Most of the water supply in the Western United States originates in the high mountain ranges as snowfall during winter periods. Snowmelt augmented by spring precipitation produces runoff which is utilized downstream. Fall precipitation influences the soil moisture conditions prior to snowpack accumulation and has a bearing upon runoff the following year.

A. Regional Climatology

From 1982 to 1984 the Western United States, especially Utah, experienced an unprecedented wet cycle of precipitation. The pattern changed in 1985 with conditions returning to slightly above normal. During the 1986 water year, the extremely wet trend returned, and the upper Colorado River Basin experienced above average precipitation. The 1987 weather pattern changed dramatically with near normal valley precipitation and mountain snowfall much below normal. The resulting 1987 runoff was substantially below normal. The drought continued from 1988 through 1992 with runoff amounts much below normal for six consecutive years. The 1993 runoff improved substantially with above average flow conditions occurring in most river basins. In 1994, drought conditions returned throughout much of the West. From 1995 through 1999, water supplies were much improved with above average runoff in Emery County. From 2000, through 2004, runoff was much lower than normal. Precipitation was variable during 2001, however, drought followed into 2002. The 2003 water year was nearly as severe as 2002 with flows less than 40%. Finally, in 2005 and 2006 wet conditions returned to the West and resulted in improved water supplies in the Huntington Creek drainage. Most local reservoirs filled to capacity. Extreme drought returned to the region once again in 2007. Below average precipitation and snowfall coupled with dry and hot conditions in March and April resulted in greatly reduced water supplies which, in turn, severely restricted irrigation water supplies during August and September. From 2008 through the 2010 water years, drought conditions eased in the region, filling the reservoirs to capacity, resulting in more abundant water supplies for agriculture and culinary uses. In 2011, near record precipitation occurred. The wet cycle of precipitation mimicked the amounts seen in the early 80's. Spring runoff lasted well into the summer months. Many of the drainages in Emery County swelled beyond their banks. Drought returned in 2012 with recorded precipitation amounts of about 50% that of the 2011 reports. Temperatures were generally above normal for all reporting locations. The 2013 water year started dry, however extremely wet conditions were experienced in March and April and again in August and September. The year ended in normal in both temperature and precipitation. In 2014, conditions were similar to the previous year with above normal temperatures and below normal precipitation. The exception to 2014 was the isolated thunder storms that occurred in August and September recording 200% above normal rainfall amounts.

The water year for 2015, generally experienced below normal precipitation in October and November. Normal to near normal precipitation from December to April, and excessive rainfall in May through July. The water year ended the last two months very dry in most recording stations. In May and June the area experienced rainfall in amount of 200 to 300% of the historical monthly average in all reporting areas. Temperatures were generally above normal throughout the year for all reporting stations.

B. Local Climatology

1. Precipitation

Precipitation amounts recorded for the 2015 water year will be presented for the Castle Dale, Huntington Plant, and East Mountain weather stations. Weather monitoring for Electric Lake was eliminated in 2008 and is no longer reported. The values for Castle Dale, Huntington and East Mountain are shown in Table 1.

Precipitation in Emery County during 2015 was generally above normal throughout the valley but also saw extremes. Precipitation at the valley reporting station at Castle Dale was 120% of normal while precipitation at Huntington Plant was 95% of normal. East Mountain precipitation reported 123% of its historical average.

Tables 2 through 6 report precipitation totals at Castle Dale, Huntington Plant, Electric Lake (no longer recorded), and East Mountain from the beginning of operation at each site. The tables indicate monthly trends as well as fluctuations in yearly totals. Figure 2 shows monthly precipitation at the East Mountain site for the 2015 water year. The monthly historical average is shown to directly compare the current year to the historic values.

The correlation of precipitation levels with spring discharges will be discussed in the East Mountain Springs section of this report.

2. Temperatures

During the 2015 water year, temperatures were above normal at Castle Dale, Huntington Plant, and the East Mountain stations. Temperatures at Castle Dale were variable throughout the year with temperatures between -1.8 to 8.4 degrees departure of its normals. For the year, the average temperature was 3.1 degrees above the historical average. At the Huntington plant, temperatures were also variable. For the year, the average annual temperature was 1.7 degrees above normal.

At the East Mountain station, temperatures were variable throughout the year. Highest departures were 12.8 and 10.7 in February and September, respectively. Lowest departures were -3.4 and -2.6 in April and July. For the year, the temperature at East Mountain averaged 3.6 degrees above normal.

A comparison of 2014 and 2015 temperatures for the three stations is addressed since temperatures also influence water supplies from year to year. Table 8 depicts the variation and compares 2014 to 2015.

III. DRAINAGE SYSTEMS

The surface drainage system on East Mountain/Trail Mountain is divided into two major drainages; the southwest portion forms part of the Cottonwood Creek drainage, and the northeast portion contributes to the Huntington Creek drainage. (See Map HM-1) The drainage boundaries, including minor subdivisions to Cottonwood and Huntington creeks, are designated on the accompanying map. The surface drainage system on Trail Mountain is totally contained within the Cottonwood Creek drainage system, with minor subdivisions flowing to Indian and Cottonwood Canyon creeks. Both Huntington and Cottonwood creeks flow out of the Wasatch Plateau in a southeasterly direction. The creeks merge with Ferron Creek to form the San Rafael River, which is a tributary of the Green River.

A. Huntington Creek Drainage System

Huntington Creek is comprised of many smaller tributary streams that feed the main stream. Deer Creek, Meetinghouse Canyon, Mill Fork Canyon, Rilda Canyon, and a portion of Crandall Canyon creeks are the only tributaries to Huntington Creek that emanate from within PacifiCorp's coal mining areas.

1. Huntington Creek

Flow data are recorded on a continuous basis by PacifiCorp at three locations; stations are located on 1) Huntington Creek near PacifiCorp's Huntington Plant, 2) Huntington Plant Diversion, and 3) Huntington Creek below Electric Lake about 22 miles upstream from the Huntington Plant. Flow records are maintained by PacifiCorp in order to determine water entitlements and reservoir storage allocation for the various users on the river.

Table 9 shows a summary of actual recorded Huntington Creek flows below Electric Lake and above Huntington Plant. The daily discharges for the 2015 water year (October 2014 - September 2015) at the two stations are found in Appendix A. During the 2015 water year, the total flow of Huntington Creek at the Huntington Plant was 37,121 acre feet.

During 2015, water quality information on Huntington Creek near the Deer Creek confluence was compiled on a quarterly basis. Locations of water quality sampling stations monitored by PacifiCorp-Interwest Mining Company are listed below (refer to Map HM-1).

a. HCC01 - Above Power Plant Bridge
b. HCC02 - Below Deer Creek Confluence
c. HCC04 - Below Bridge @ Research Farm Bridge +
+ Not listed on map due to scale.

Specific water quality constituents analyzed are shown in Tables 11, 12, and 13. Values are in milligrams per liter unless otherwise noted. Raw data is on file at the Interwest Mining Company Main Office. In general, the water shows a gradual increase in concentration of dissolved minerals as the flow proceeds down Huntington Canyon.

2. Deer Creek

Deer Creek is an ephemeral tributary of Huntington Creek and flows from the same canyon in which the Deer Creek Mine is located. PacifiCorp monitors the characteristics of Deer Creek according to the following flow and sampling schedule:

a. Flow and Sampling Schedule
   (1) Locations:
      (a) Above the Mine - DCR01
      (b) @ Permit Boundary - DCR04
      (c) Below the Mine - DCR06
      (See Map HM-1)
   (2) Flow: Information is collected during the first or second week of each month.
   (3) Water Quality Sampling:

Water samples are collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed are those listed in the DOGM Guidelines for Surface Water Operational Quality. (See Volume 9 of the Deer Creek Permit) The program was initiated in March 1988 and continues through 2016 (i.e. sampling conducted in March, June, September, and December). Field measurements including pH, specific conductivity, and temperature are performed in conjunction with quality measurements. Quantity is monitored monthly.

b. Flow Information

As stated above, flow information is collected monthly throughout the year with the use of two Parshall flumes. (See Map HM-1 for flume locations.) A hydrograph showing all the data collected for 2015 and 1984-2014 has been generated for each location. (See Appendix B) The hydrographs show that after the power was disconnected and mine was sealed, the flows recorded below the mine portals eventually terminated. All future flows will only originate from ephemeral sources such as snow melt until Deer Creek resumes discharging. Above the mine discharge, runoff occurred at DCR01 from June through August. Flow at the lower two locations ceased in August.

c. Quality Information

In accordance with the Hydrologic Monitoring Plan, baseline quality analysis was performed in 2011. Baseline analysis is repeated once every five (5) years. The results of the historical operational quality analysis are listed in Tables 14 and 15. The minimum, maximum, and mean values are given for a five-year period along with the historical results. Values are in milligrams per liter unless otherwise noted. It is apparent from historical information in the tables that the quality of the Deer Creek runoff degrades slightly from the upper to the lower sampling point. The quality of the lower sampling point is thought to be affected by the Mancos Shale which outcrops above the lower sampling location. Raw data is on file at the Interwest Mining Office in Huntington Utah.

3. Meetinghouse Canyon Creek

Meetinghouse Canyon Creek is an ephemeral tributary of Huntington Creek and is monitored according to the following schedule (see Hydrologic Monitoring Schedule in Appendix I).

a. Flow and Sampling Schedule
   (1) Location: South Fork of Meetinghouse Canyon (See Map HM-1)
   (2) Flow: Information is collected during the first or second week of each month.
   (3) Water Quality Sampling:

Water samples were collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed were those stated in the DOGM Guidelines for Surface Water Operational Quality. (See Volume 9 of the Deer Creek Permit) The program was initiated in March 1984 and will continue through 2016, (i.e. sampling conducted in March, June, September, and December). Field measurements including pH, specific conductivity, and temperature were performed monthly in conjunction with quality measurements. Quantity was monitored monthly.

b. Flow Information

A hydrograph comparing 2015 and 1984-2014 can be found in Appendix C. For location MHC01, flow occurred in June (160.71 gpm) and July (60 gpm) during the 2015 water year.

c. Quality Information

In accordance with the Hydrologic Monitoring Plan, baseline quality analysis was performed in 2011. Baseline analysis is repeated once every five (5) years. Quality sampling was initiated in 1986. When there is flow at location MHC01, Table 16 will list the minimum,

maximum, and mean values along with historical results. Raw data is on file at the Interwest Mining Office in Huntington Utah.

4. Mill Fork Canyon

Mill Fork Canyon is a tributary of Huntington Creek and was included in PacifiCorp's monitoring program starting in 1997. Monitoring of Mill Fork is conducted according to the following schedule (see Volume 9 of the Deer Creek Permit). Mill Fork Canyon is ephemeral from its headwaters to the western border of Section 21, Township 16 South, Range 7 East, and intermittent from that point to the confluence of Huntington Creek.

a. Flow and Sampling Schedule
   (1) Locations:
      (a) Above Mill Fork Fault – MFU03
      (b) Above Old Mines - MFA1
      (c) Mill Fork Canyon Culvert - MFB2
         (See Map HM-1)
   (2) Flow: Information is collected during the first or second week of each month.
   (3) Water Quality Sampling:

Water samples were collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed are those listed in the DOGM Guidelines for Surface Water Operational Quality. (See Volume 9 of the Deer Creek Permit) The program was initiated in 1997, and will continue through 2016 on a quarterly basis, i.e., March, June, September, and December. Field measurements, including pH, specific conductivity, and temperature were performed quarterly in conjunction with quality measurements. Quantity was monitored monthly.

b. Flow Information

Flow information is collected monthly throughout the year (See Map HM-1 for locations.) A hydrograph has been generated for each location. (See Appendix D) All three sites flowed sometime during the 2015 waster year.

c. Quality Information

Historical monitoring data collected by Beaver Creek Coal Company - No. 4 Mine and the United States Geological Survey (site No. 76: Open File Report 81-539) has been incorporated in PacifiCorp's hydrologic database. Operational water quality monitoring was conducted during 1997 and 1998 (refer to the Quarterly Hydrologic submittals). Baseline quality analysis was initiated in November 1998 (2002 for MFU03). In accordance with the Hydrologic Monitoring Plan, baseline quality analysis was performed in 2011. Baseline analysis is repeated

once every five (5) years.

Historical results of the samples collected are presented in Tables 17, 18 and 19. It is apparent from the data that the quality of the water degrades slightly from the upper reaches of Mill Fork, i.e., MFU3 to the mouth of the canyon, i.e., MFB2. Water quality has remained relatively consistent from year to year. (See Tables 17, 18 and 19). Raw data is on file at the Interwest Mining Office in Huntington Utah.

5. Rilda Canyon Creek

Rilda Canyon Creek is a tributary of Huntington Creek and is monitored according to the following schedule (see Appendix I). Rilda Canyon Creek is ephemeral from its headwaters to the western border of Section 28, Township 16 South, Range 7 East, and perennial from that point to the confluence of Huntington Creek.

a. Flow and Sampling Schedule

(1) Locations:

(a) Right Fork of Rilda - RCF1*
(b) Left Fork of Rilda - RCLF1**
(c) Left Fork of Rilda - RCLF2**
(d) Rilda Canyon - RCF2*
(e) Rilda Canyon - RCF3
(f) Rilda Canyon - RCW4 (See Map HM-1)

* During mining of the North Rilda leases, an additional site was added in 1999 upstream of RCF1 (adjacent to EM-163) to monitor surface/groundwater relationships. Flow will be measured yearly during base flow conditions.
** Flow and field parameters only.

(2) Flow: Information is collected during the first or second week of each month.

(3) Water Quality Sampling:

Water samples were collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed are those listed in the DOGM Guidelines for Surface Water Operational Quality. (See Volume 9 of the Deer Creek Permit) The program was initiated in June 1989 except for RCLF1 and RCLF2, which were initiated in 1990 and 1995, respectively, and will continue through 2016 on a quarterly basis, i.e., March, June, September, and December. Field measurements, including pH, specific conductivity, temperature, and dissolved oxygen, were performed at the perennial stream locations, i.e., RCF3 and RCW4, monthly in conjunction with quality measurements. Quantity was monitored monthly.

b. Flow Information

Flow information is collected monthly throughout the year with the use of three Parshall

flumes and one V-notch weir. (See Map HM-1 for locations.) A hydrograph has been generated for each flume-weir location. (See Appendix E) Springs utilized by North Emery Water Users Special Services District (NEWUSSD) for culinary purposes are situated between monitoring locations RCF2 and RCF3. Flow above the spring area is ephemeral and below the stream is perennial. For location RCF1 flow occurred during the months of April and September with a peak flow estimated at 2,066 gpm in June. RCLF1 and RCLF2 recorded flow from June and July. For location RCF2 flow occurred during the months of May through July and peaked at 1556 gpm in June,. Below the spring area the stream is perennial and increases in flow from RCF3 to RCW4. During 2015 the peak flow for RCF3 was estimated at 2,693 gpm (June); for RCW4, 2,748 gpm (May). Baseline flow for 2015 at RCF3 and RCW4 was approximately 20 and 103.9 gpm, respectively. Data suggest that above the NEWUSSD springs the stream loses water to the alluvium and below the spring area the alluvium recharges the stream causing the flow to increase.

c. Quality Information

In accordance with the Hydrologic Monitoring Plan baseline quality analysis was performed in 2011. Baseline analysis is repeated once every five (5) years. Quality sampling was initiated in 1989; results of the samples collected are presented in Tables 20, 21, and 22. It is apparent from the data that the quality of the water degrades from the upper reaches of Rilda Canyon, i.e., RCF1, to the NEWUSSD spring area, and from that point to the mouth of the canyon, i.e., RCW4. Water quality has remained relatively consistent from year to year. (See Tables 20, 21, and 22) Raw data is on file at the Interwest Mining Office in Huntington Utah.

B. Cottonwood Creek Drainage System

The southern portion of East Mountain and the entire Trail Mountain is intersected by Cottonwood Creek and its associated tributaries, including Cottonwood Canyon Creek and Grimes Wash. The Cottonwood Creek drainage is about equal in size to the Huntington drainage, with a total discharge from each of the drainages of about 70,000 acre feet per year. The major cultural feature on Cottonwood Creek is Joes Valley Reservoir, located about twelve miles west of the town of Orangeville. The 63,000 acre foot reservoir was constructed by the U. S. Bureau of Reclamation and provides storage water for irrigation, industrial, and municipal needs in the Emery County area.

PacifiCorp monitors three of the tributaries of the Cottonwood Creek drainage system, Cottonwood Canyon Creek, Grimes Wash and Indian Creek. (See Maps HM-1 and MFS1851D)

1. Cottonwood Canyon Creek

Based on data collected by PacifiCorp, Cottonwood Canyon Creek is an ephemeral stream from its headwaters to Section 24, Township 17 South, Range 6 East and intermittent from that point to its confluence with Cottonwood Creek. The majority of water moving through Cottonwood Canyon Creek appears to be through the colluvial valley deposits. An extensive

hydrogeologic investigation was conducted in Cottonwood Canyon Creek during 1992. Results can be found in Appendix C of the PAP. Four (4) permanent runoff sampling sites have been established along Cottonwood Canyon Creek and sampled as listed below. (See Hydrologic Monitoring Plan in Volume 9 of the Deer Creek Permit).

Sites transferred to Bowie Resource Partners, LLC effective June 15, 2015.

Flow and Sampling Schedule

(1) Locations: (See Map HM-1)
- (a) Above Mine - SW-1
- (b) Below Mine - SW-2
- (c) @ USGS Flume - CCC01 (Flow and field parameters only)
- (d) Above Straight Canyon - SW-3

(2) Flow: Information is collected during the first or second week of each month.

(3) Water Quality Sampling:

Water samples were collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed were those stated in the DOGM Guidelines for Surface Water Operational Quality. (See Volume 9 of the Deer Creek Permit) The program was initiated in December 1992 and will continue through 2016, i.e. March, June, September, and December. Field measurements including pH, specific conductivity, and temperature were performed monthly in conjunction with quality measurements. Quantity was monitored monthly.

b. Flow Information

As stated above, flow information is collected monthly throughout the year. (See Map HM-1 for flume locations.) A hydrograph for January thru June 2015 has been generated for each sampling location. (See Appendix F) The hydrographs show the intermittent nature of Cottonwood Canyon Creek. Flow at SW-1was recorded during the months of March thru June. Interwest Mining recorded flow at SW-2 from October 2014 thru June 2015(site transferred to Bowie Resources) with a peak flow estimated at 18.2 gpm (May). Flow was recorded at SW-3 during April, May and June 2015. Flows recorded at SW-2 and SW-3 can be influenced by discharge from the Cottonwood Mine (TMA001).

c. Quality Information

In accordance with the Hydrologic Monitoring Plan, baseline quality analysis was performed in 2011. Baseline analysis is repeated once every five (5) years. The results of the historical operational quality analysis are listed in Tables 23, 24, and 25. The minimum, maximum, and mean values are given for a five-year period along with the historical results. Values are in milligrams per liter unless otherwise noted. Raw data is on file at the Interwest Mining Office in Huntington Utah.

The Cottonwood Canyon Creek drainage quality is influenced by the following factors: 1) A relatively high amount of suspended solids during spring runoff from Indian, Roans, Mill, and Marines canyons; 2) Alluvial/colluvial deposit recharge and discharge areas.

2. Grimes Wash

Grimes Wash is an ephemeral tributary of Cottonwood Creek and flows in the same canyon in which the Wilberg/Cottonwood Mine is located. Three permanent runoff sampling sites were established in 1980 and are sampled as listed below (see Hydrologic Monitoring Plan in Volume 9 of the Deer Creek Permit).

a. Flow and Sampling Schedule

(1) Locations: (See Map HM-1)

(a) Right Fork - GWR01

(b) Left Fork - GWR02

(c) Below the Mine - GWR03

(2) Flow: Information is collected during the first or second week of each month.

(3) Water Quality Sampling:

Water samples were collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed were those stated in the DOGM Guidelines for Surface Water Operational Quality. (See Volume 9 of the Deer Creek Permit) The program was initiated in March 1988 and will continue through 2016, i.e. March, June, September, and December. Field measurements including pH, specific conductivity, and temperature were performed in conjunction with quality measurements. Quantity was monitored monthly.

b. Flow Information

As stated above, flow information is collected monthly throughout the year with the use of two Parshall flumes. (See Map HM-1 for flume locations.) A hydrograph comparing 2015 to the data collected from 1984 through 2014 has been generated for each flume location. (See Appendix G) All sites remained dry all year. Seeps or dampness at GWR03 was noted throughout the year due to the influence of the springs emanating from the Starpoint Sandstone/Mancos Shale formational contact.

c. Quality Information

In accordance with the Hydrologic Monitoring Plan baseline quality analysis was performed in 2011. Baseline analysis is repeated once every five (5) years. The results of the 2015 operational quality analysis are listed in Tables 26, 27, and 28. The minimum, maximum, and mean values are given for a five-year period along with the historical results. Values are in

milligrams per liter unless otherwise noted. Raw data is on file at the Interwest Mining Office in Huntington Utah.

The Grimes Wash drainage quality is influenced by two factors: 1) Under normal conditions the Right Fork contributes a relatively high amount of suspended solids during spring runoff due to the fact that it is a south facing canyon dominated by argillaceous sediments; 2) Mancos Shale/Starpoint Sandstone interface seeps and springs elevate the TDS at GWR03.

3. Indian Creek

Indian Creek is a perennial tributary of the Cottonwood Creek and flows in Upper Joes Valley and merges with Lowry Water near the Joes Valley Reservoir. Four permanent runoff sampling sites were established in 2001 and are sampled as listed below (see Hydrologic Monitoring Plan in Volume 9 of the Deer Creek Permit).

a. Flow and Sampling Schedule
   (1) Locations: (See Map MFS1851D)
      (a) Above Camp Ground - ICA
      (b) Indian Creek Flume - ICF
      (c) Indian Creek Ditch - ICD
      (d) Below Cross-Over Road - ICB
   (2) Flow: Information is collected during base flow only (October)
   (3) Water Quality Sampling:

Water samples were collected and analyzed during base flow monitoring. Parameters analyzed will be those stated in the DOGM Guidelines for Surface Water Operational Quality. (See Volume 9 of the Deer Creek Permit) The program was initiated in October 2001 and will continue through 2016. Field measurements including pH, specific conductivity, and temperature were performed in conjunction with quality measurements.

b. Flow Information

As stated above, flow information is collected during base flow only with the use of portable 90° v-notch weir and one permanent Parshall flume. Flow occurred at all four locations with the highest flow (539 gpm) occurring at ICF. (See Map MFS1851D for monitoring locations.)

c. Quality Information

In accordance with the Hydrologic Monitoring Plan baseline quality analysis was performed in 2011. Baseline analysis is repeated once every five (5) years. The results of the 2015 operational quality analysis are tabulated in the Tables section. Values are in milligrams per liter unless otherwise noted. Raw data is on file at the Interwest Mining Office in Huntington Utah.

IV. SPRINGS

A. East Mountain

Between the times where PacifiCorp began monitoring springs on East Mountain and 1986, the number of springs measured increased from less than fifty (50) to nearly eighty (80). PacifiCorp believed that more benefit could be realized by concentrating its monitoring to selective springs in the areas that were to be undermined within the following five years. (See Map HM-5) A meeting was held on March 25, 1987 with the U. S. Forest Service and the Utah State Division of Oil, Gas and Mining to determine the most effective plan for PacifiCorp's monitoring. A subsequent meeting was held on April 15, 1987 with the State Division of Oil, Gas and Mining to finalize the monitoring plan revisions. In addition to major revisions made in 1987, each year, State and Federal agencies are invited to participate in adjusting the monitoring schedule based on field investigations.

During the meetings it was resolved that the following springs would be monitored. Eight additional springs (denoted with a plus [+] symbol below) were added in 1989 after the annual field verification process jointly conducted by DOGM and PacifiCorp.

*	Burnt Tree Springs		79-40
*	Elk Spring (dev. in 2009)		80-41
*	Sheba Springs		80-43
	Ted's Tub	*	80-44
	79-2	*	80-46
*	79-10		80-47
	79-15	+	80-48
*	79-23		80-50
	79-24		82-51
*	79-26	*	82-52
+	79-28	*	84-56
*	79-29	+	89-60 (Alpine Spring)
	79-32	+	89-61 (developed in 2009)
	79-34	+	89-65
*	79-35	+	89-66
	79-38	+	89-67
		+	89-68

Of the above noted springs, 25 have been highlighted. PacifiCorp selected these springs for elimination from its groundwater monitoring program. In November, 2014, the above highlighted sites were approved for removal by DOGM and were eliminated from the hydrologic monitoring program.

For those sites that are highlighted, approval to remove from the hydrologic monitoring program was granted February 2016. The data for these sites were submitted to DOGM in the 4th quarter of 2015 and the 1st quarter of 2016.

PacifiCorp will continue to monitor the two remaining springs. July samples were collected and analyzed and are presented in Appendix H. PacifiCorp will continue to monitor these sites until it is approved by DOGM to eliminate.

Until January 2015, PacifiCorp's active underground mining operations were located in the north end of East Mountain within its Mill Fork Lease. The last production day from the Deer Creek Mine was January 7, 2015. The mine portals in Deer Creek Canyon was sealed in April 2015. The only portion of the mine that is still open (no production) is the Mill Fork area which is accessed from the Rilda Canyon portals. The following springs were chosen to monitor the groundwater hydrology in the Mill Fork area as underground coal mining operations were active. It is planned to monitor these springs until relinquishment of the coal leases are approved by the federal agencies.

Mill Fork Springs:

EM-216	EMPOND
GRANTS SPRING	LITTLE BEAR
JV-9	JV-34
MF-7	MF-10
MF-19B	MF-213
MF-219	MFR-10
MFR-30	RR-5
RR-15	RR-23A
SP1-26	SP1-29
UJV-101	UJV-206
UJV-213	

1. Flow and Sampling Schedule

a. Flow

All springs on the preceding two lists are measured during the months of July and October. Flow measurements are collected utilizing volume per time period (i.e. gallons per minute).

b. Quality Samples

All springs listed above are sampled for water quality characteristics during the months of July and October. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Operational Quality. (See Volume 9 of the Deer Creek Permit)

2. Spring Flow

Spring flow characteristics in the start of the 2015 water year were similar to the 2014 water year. Response of spring discharge within the East Mountain - Mill Fork area was

somewhat limited. Dry conditions were realized throughout the region during early spring and fall. Although yearly precipitation reported as normal, the reported value was somewhat skewed by heavy late summer storms producing high runoff.

Temperature, also a critical factor on spring discharge rates, was reported as above normal in 2015 as compared to historic values. Spring temperatures were markedly higher. March recorded a 12.8 degree departure from normal and June recorded a 5.6 degree departure. These higher temperatures increase evaporation and runoff rates. Snowpack in the higher elevations was normal resulting spring flow returning to their normal historic flows.

Table 29 is a tabulation of the flow data collected during the 2015 monitoring season. To record the season variation, all springs measured in July are measured again in October. The seasonal variation is represented in Table 29, under the column heading "Seasonal Net Change." The percentage figures represent the amount of change, either positive or negative. The average change reveals a 52.45% [19.% by volume] decrease from the July to the October measurements for the East Mountain Mill Fork springs.

A 15 year comparison of spring discharge for the Mill Fork springs is shown in Table 30. The table includes a year by year comparison of springs identified from each mode of occurrence (Table 31). The springs utilized in the comparison are found in Table 31. The flow values for the individual springs represent the July measurements. October measurements were not utilized because winter weather conditions caused some springs to become inaccessible.

Table 30 has been compared to East Mountain climatology to see how closely spring discharge rates follow local annual precipitation. Figure 3 reveals good correlation between spring discharge and precipitation. Along with precipitation, temperature plays a critical role in yearly discharge variations, especially during the early stages of the runoff period. Listed in Table 32 is a comparison of January through June temperature data from surrounding weather stations for the period 1982-2015 versus departure from normal. The comparison is vital in determining mining effects on spring discharge versus general changes in annual precipitation.

Table 32 clearly demonstrates near average temperatures between 1982 and 1984, but starting in 1985 and continuing through 2000 (except for 1991 and 2001) positive departure from normal has been significant. In 2001, temperatures averaged 1.8 degrees departure above the normal from the three reporting stations. Comparison between spring discharge rate and general changes in annual precipitation patterns correlated well in the past due to abnormal temperatures experienced during the early runoff period (January through June). Figure 3 not only includes a comparison of spring discharge rate and precipitation as in the past, but also temperature departure due to the critical influence temperature has on peak discharge occurrence.

An additional flow information study was initiated during the summer of 1985. The purpose of the program was to establish flow recession curves for the following springs: (1) Burnt Tree, (2) Elk Springs (developed in 2009), (3) Sheba, (4) 79-10, (5) 79-23, (6) 79-26, (7) 79-29, (8) 79-35, (9) 80-44, (10) 80-46, (11) 82-52, (12) 84-56. Note that all but Sheba Spring

has been removed from the monitoring. Flow recession curves are no longer developed for hydrologic comparison. Refer to this information in past hydrologic reports.

3. Quality

The quality of the springs sampled in 2015 reveals an excellent correlation with historical averages. A summary of the water quality analysis for a representative group of East Mountain Springs is presented in Table 34. In the table, the mean values for 2015 are compared to the historical results for each respective spring. Raw data is on file at the Interwest Mining Company Main Office.

B. Rilda Canyon - North Emery Water Users Special Services District (NEWUSSD)

Of concern to PacifiCorp, is the proximity to which mining activities in Rilda Canyon are to the Rilda Canyon Springs. Rilda Canyon Springs currently serve as a culinary water source to the North Emery Water Users Special Services District (NEWUSSD). The NEWUSSD spring system consists of a series of collection lines extending westward up Rilda Canyon and southward up a small side drainage (shown on Map HM-8 in Volume 9 of the PAP). The NEWUSSD spring system is metered at three locations. Meter 1 (Side Canyon Spring) is located at the downstream end of a collection line which enters Rilda Canyon from the South. Meter 2 (Removed – 2013 -Side Canyon Spring plus South Spring) was located near the bottom of the main east-west trending collection line which lies to the south of Rilda Canyon Creek at a point just upstream (west) of the main spring collection box. Meter 3 (North Spring) records flows for the east-west central collection line which was constructed through the central portions of the valley near Rilda Canyon Creek. Meter 4 (North Spring) collects data from the north collection line located on the north side of Rilda Canyon Creek. During 1995 flow from the north collection line was combined with the central collection system. As a result Meter 4 was terminated.

1. Spring Flow

Through the cooperative efforts of PacifiCorp and NEWUSSD, flow meters were installed in September 1990 to isolate individual spring areas for quantity and quality measurements (see Map HM-8 in Volume 9 of the PAP). Table 35 lists the flow rates for meter 3 (Meter 1 and Meter 2 were removed in 2013).

The seasonal variation of the monthly average flow from NEWUSSD's Rilda Canyon Springs is shown in Figure 4. With the installation of flow meters, individual spring contribution to the total flow can be plotted over time.

In early 2009, North Emery Water Users Special Service District and Energy West Mining Company (now known as Interwest Mining Company) completed a spring development and pipeline project (called the Elk Springs Project). This project involved developing and piping of water from two springs, Elk Spring and Spring 89-61, on top of East Mountain. The

pipeline traverses down a ridge in a subsurface trench 7,000 feet, to a cliff face (the Castlegate Sandstone escarpment). A directional drill hole was completed and cased behind the cliff face for 2,600 linear feet with a 700-foot elevation drop. The pipeline resumes below the escarpment and follows the existing road in the canyon bottom (Meetinghouse Canyon) in a subsurface trench another 15,300 feet to the slow-sand water treatment plant in Huntington Canyon. This treatment plant is operated by NEWUSSD. Total length of the pipeline is 4.7 miles. Total elevation drop of the entire pipeline is about 2,900 feet.

The purpose of this project is to provide NEWUSSD with a long-term dependable source of water to supply the water treatment plant in Huntington Canyon. This source is not subject to interruptions due to surface activities in the vicinity of the springs, or is it affected by underground coal mining activities that have been common in the area. NEWUSSD and Energy West (nka Interwest Mining Company) committed to mitigation work to offset the capture of water from the Elk and 89-61 springs in the form of improvements to 4 other springs nearby on East Mountain. A commitment was also made on the part of NEWUSSD to keep a minimum flow to the surface from Elk and 89-61 springs at all times to preserve the wetlands around those springs. In 2010, work was initiated to fence the perimeters of the wetlands of springs 79-1, 80-48, 89-67, and 89-68. Energy West (nka Interwest Mining Company) completed two of the springs in 2010. NEWUSSD completed construction around the remaining springs in 2012.

Development of Elk Springs and 89-61 rendered the continued collection of spring flow data impractical, since the major quantity of waters issuing from these springs is piped to the NEWUSSD treatment plant. No data for these springs will be included with future Hydrology Reports; however, the historical data is referenced in previous reports.

2. Quality

Baseline quality sampling of the individual springs was performed in 2011. The minimum, maximum, and mean results of the 2015 spring flow compared to historical quality analysis are listed in Table 36. Values are in milligrams per liter unless otherwise noted. Raw data is on file at the Interwest Mining Company Main Office. As stated in Volume 9 of the PAP, differences in the groundwater quality data reflect differences in the groundwater source or the origin of groundwater for the various springs issuing within the Rilda Canyon Springs area. Waters issuing from the North Spring collection system area (Meter 3) are of better quality than waters from South Spring collection areas. Water issuing from the North Spring originates primarily from water moving within the alluvial valley sediments and fracture systems of the Starpoint Sandstone and is not derived from the Blackhawk Formation.

V. MINE HYDROLOGY

A. Groundwater and Surface Water Sources in Relation to Mine Workings

The relationship of the Deer Creek, Cottonwood/Wilberg, and Trail Mountain mine workings with the overlying springs is shown in Map HM-5. Beginning in 1979 (Trail Mountain - 1992), PacifiCorp has developed an ambitious spring monitoring program with emphasis to detect changes in the East and Trail Mountain hydrologic regime as a result of mining. In 2014, most of the spring monitoring on the southern of East Mountain were terminated since no mining has occurred there for nearly 30 years. Monitoring of Trail Mountain was terminated with the sale of the mine to Bowie Resource Partners LLC. The data collected to that date reveal no indication of any mine-related effects on spring discharge or surface flow rates. Figure 3 shows a fairly close correlation between spring discharge rates compared to precipitation and temperature for the springs in the Mill Fork area.

B. Groundwater Quality and Collection Procedures

PacifiCorp began in-mine quality and quantity measurements in 1977 and continued monitoring until 2015. With the collection of numerous samples throughout the extent of the mine workings, the quality has remained relatively constant. In-mine monitoring was discontinued in the Deer Creek Mine in the 1st quarter of 2015. In-mine monitoring was discontinued at Cottonwood and Trail Mountain during 2001 due to mine sealing/temporary cessation of operations.

Collection procedures for groundwater quality consist of two grab samples collected and analyzed per quarter at each of the mines which produces measurable quantities of water. Sampling according to this established plan began in the first quarter of 1982. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Operational Quality except when new sites are established. In that case, baseline information will be collected for two (2) years. (See Appendix I)

Long-term monitoring locations were established at each of the mines which produce measurable quantities of water, i.e., Deer Creek, Cottonwood/Wilberg, and Trail Mountain mines. (See Maps HM-2, HM-3, and Plate 7-3 from previous Annual Reports) As stated earlier, in-mine monitoring at Cottonwood and Trail Mountain during 2001 was discontinued due mine sealing/temporary cessation of operations. Four types of occurrences have been recognized to exist within the current mine workings. (Refer to Figure 5)

1. Structural rolls with overlying fluvial channels,
2. Fault systems (Pleasant Valley and Roans Canyon),
3. Fractures and joints (lineaments),
4. Roof bolt and in-mine drill holes.

A collection device was installed at each long-term monitoring location. Flow and temperatures were collected on a quarterly basis from the long-term sites in both mines were fairly consistent.

C. Mine Water

1. Deer Creek Mine

a. In-Mine Water Production

This data was reported in previous reports. However, since the mine was sealed in April of 2015, the data is no longer available. Since April 2015, no mine water discharge has been recorded. PacifiCorp will continue monitoring the mine discharge until it is approved to terminate this activity. Figure 7 charts the discharge from the Deer Creek Mine during the time it was discharging from January to April 2015.

b. In-Mine Quality

Two sites were sampled in the Deer Creek Mine in the 1st quarter of 2015 (See Map HM-2 in previous reports for locations.) Parameters analyzed in 2015 are those listed in the DOGM Guidelines for Groundwater Baseline or Operational Quality. (See Appendix I)

Table 40 lists the characteristics of the samples collected and compares the mean, minimum, and maximum results of 2015 to the historical values for each location. It is apparent from Table 40 that the average quality of the in-mine water has remained relatively constant. Raw data is on file at the Interwest Mining Company Main Office.

c. Discharge Quantity

Historically, all excess water not utilized in the mining operation or for domestic use was either pumped to storage areas or discharged from the mine. The largest volume of water was stored in the western part of Main West, which has not been actively mined for several years.

In-line flow meters were utilized to record the amount of water discharged from the mine, after which it passed through underground sedimentation sumps. Discharge from Deer Creek was either shipped directly to Huntington Power Plant or to the Deer Creek drainage in accordance with stipulations of the Deer Creek UPDES Discharge Permit UT-0023604-002.

As outlined in the reclamation plan, it is expected that mine water will gravity feed toward the Deer Creek portals. Therefore, a French drain system was installed inby the portal seals. All discharge from the Deer Creek portal area will be monitored for quality and quantity. Compliant discharge will be routed to the Deer Creek drainage. Non-compliant water will be piped to the Huntington Power Plant. After the seals were installed in April, no discharge has

been recorded from the Deer Creek mine portal area.

d. Discharge Quality

Monthly water quality samples (4) were collected for 2015 until underground pumps were de-energized. Table 41 compares the minimum, maximum, and mean values from an historical standpoint to 2015. An examination of Table 41 reveals excellent correlation with historical results. Raw data is on file at the Interwest Mining Company Main Office.

2. Wilberg/Cottonwood Mine

The mine fire, which occurred in late 1984, altered normal hydrologic monitoring at the Wilberg Mine. Normal hydrologic monitoring was reinstated in late 1985 and continued through May 2001. Energy West Mining Company (nka Interwest Mining Company) notified the Division of temporary cessation of coal mining operations at the Cottonwood/Wilberg Mine effective May 29, 2001. Coal mining at the Trail Mountain Mine/coal transfer to Cottonwood Tipple ceased as of March 15, 2001. In preparation of temporary cessation, all associated mining equipment including; belt haulage (drives and headrollers), dewatering (pumps and control boxes) and electrical (transformers/rectifiers) were removed from the mine. Verification of equipment removal was conducted on May 4, 2001 with Division of Oil, Gas and Mining (Pete Hess) participating in the review. Bureau of Land Management was notified but was unable to attend. A plan to construct permanent seals was submitted to and approved by Mine Safety Health Administration. Sealing of the mine portals was completed on May 28, 2001.

a. In-Mine Water Production

In previous reports, the in-mine water production was arrived at by combining mine discharge, domestic use, and evaporation. Due to the fire, normal coal production and usage were not experienced. Pre-fire coal production resumed during late 1985. A large part of the mine workings have been sealed since the fire. As reported in the 1984 Annual Report, water discharged from the Wilberg Mine complex includes the area designated as the Cottonwood Mine. (The historic discharge for Cottonwood/Wilberg is charted in Figure 10) Consistent with previous years, the following table lists the factors involved in estimating in-mine water production.

Wilberg/Cottonwood Discharge

TMA Total Discharge* 9.3 Million Gallons

* Discharge Outfall 001 re-located from Grimes Wash to Cottonwood Canyon Creek TMA Portal - July 2001

b. In-Mine Quality

In-mine monitoring was discontinued during 2001 due sealing of the mine. Refer to previous Annual Hydrologic Reports for comparison of samples collected to the historical values.

c. Discharge Quantity

Prior to temporary cessation, water produced in the Wilberg Mine gravity flowed to the northern area of 1st North. At that point it could either be pumped by a vertical turbine located in the Deer Creek Mine which picks up the water and pumps it back to the south and down to the Wilberg Mine main sump or pumped directly to the main sump utilizing submersible pumps. Water produced in the Cottonwood Mine (2nd North area) is transferred to the Wilberg Mine sump. The sump, which functioned as a settling basin, effectively removes settleable solids from the water. A portion of the water was redistributed to various areas of the mine to be utilized in the mining operations. A total of 9.3 million gallons was discharged to Cottonwood Canyon Creek (TMA portal) during 2015. Discharge from Cottonwood Mine (See Figure 11) is monitored in accordance with stipulations of the Cottonwood/Wilberg Mine Discharge UPDES Permit UT-0022896.

d. Discharge Quality

Monthly samples were collected from TMA during 2015. Tables 43 compares the minimum, maximum, and mean values from 2015 to the historical values.

VI. PIEZOMETRIC GRADIENT INFORMATION

A. Surface

1. Cottonwood Canyon Creek

Eight (8) wells located along the extent of Cottonwood Canyon Creek have been monitored monthly. All but EM-31 was transferred to Bowie Resource Partners LLC in June 2015. The following table lists the zone isolated with each well.

Well I.D.	Monitoring Zone
CCCW-1A	Alluvial Deposits
CCCW-1S	Starpoint Sandstone
CCCW-2A	Alluvial Deposits
CCCW-3A	Alluvial Deposits
CCCW-3S U	Blackhawk - Fluvial Sandstone
CCCW-3S L	Starpoint Sandstone
EM-31	Lower Blackhawk/Starpoint Sandstone
TM-1B	Starpoint Sandstone
TM-3	Starpoint Sandstone (Straight Canyon)

2. Rilda Canyon

Six (6) wells located in Rilda Canyon are monitored monthly when accessible. The following table lists the zone isolated with each well.

Well I.D.	Monitoring Zone
P-1	Alluvial Deposits
P-4	Alluvial Deposits
P-5	Alluvial Deposits
P-6	Alluvial Deposits
P-7	Alluvial Deposits
EM-47	Lower Blackhawk/Starpoint Sandstone

Information collected during 2015 correlated well with historical information. Monthly levels for the individual wells have been submitted quarterly to the Division of Oil Gas and Mining.

VII. WASTE ROCK WELLS

A. Deer Creek Mine - Waste Rock Storage Facility

The Deer Creek Waste Rock Storage Facility is located on the northeast side of State Highway 31 approximately six (6) miles west of Huntington, Utah.

The geology of the Deer Creek Waste Rock Storage Facility is fairly simple and straightforward. The site is located on the southern flanks of Gentry Mountain in the area just south of Wild Horse Ridge. Rocks exposed in the area are marine-derived mudstones in the lower portion of the Masuk member of the Mancos Shale. The Masuk Shale on the bench which adjoins the proposed site on the east and west is covered by a five- to twenty-foot thick layer of terrace gravel of Quaternary age. North-south trending normal faults have disrupted the strata in the region; however, no faults are known to exist within the area of the Deer Creek Waste Rock Storage Facility.

The test wells completed prior to construction identified the existence of a limited quantity of groundwater locally in the Masuk Shale. The water is most likely flowing along fractures in the strata. The rate of water migration has been shown to be extremely slow (<100 feet per year); therefore, the operations to be conducted at the waste rock site should not impact the hydrology of the area. The weathered Masuk Shale present on and near the ground surface will act as an effective barrier to prevent the surface waters from migrating to depths and intersecting groundwater.

The groundwater present in the terrace gravels should not be impacted by the waste rock site because it is located at a higher elevation than the proposed site.

The Deer Creek waste rock site was transferred to BRC Wellington LLC in June 2015. BRC Wellington collects water samples from the well and reports to the state. Because the permit transfer was not completed in 2015, the quality results for the 4 quarters of 2015 are shown in Table 46.

B. Cottonwood/Wilberg Mines - Waste Rock Storage Facility

The Cottonwood/Wilberg Waste Rock Storage Facility is located on the west side of the Wilberg Mine road approximately 1.5 miles south of the Wilberg Mine. The geology of the waste rock site is fairly simple and straightforward. The site is located on the southern flank of East Mountain to the south of Newberry Canyon. Rocks exposed in the area are marine-derived mudstones in the lower portion of the Masuk member of the Mancos Shale. The Masuk Shale on the bench which adjoins the proposed site on the north and east is covered by a five- to twenty-foot thick layer of terrace gravel of Quaternary age. North-south trending normal faults have disrupted the strata in the region; however, no faults are known to exist within the area of the waste rock site.

In order to identify the groundwater quality characteristics of the waste rock storage facility one of the test wells completed prior to the construction of the site was developed into a long-term water monitoring well. (See Map HM-1 for location.).

The Cottonwood/Wilberg waste rock site was transferred to Bowie Resource Partners in June 2015. Bowie now retains responsibility for reporting the quality of well CWRW1.

Two samples were collected by Interwest Mining Company in 2015 prior to the transfer. The analysis is listed in Table 46. Values are in milligrams per liter unless otherwise noted. Raw data is on file at the Interwest Mining Company Main Office. It is a well-known fact that the Mancos Shale typically contains large quantities of soluble minerals such as gypsum; therefore, any water passing through it will be naturally high in dissolved solids. Samples at the waste rock well verify this condition.

VIII. EFFECTS OF MINING AND SUBSIDENCE ON HYDROLOGY

Since the development of the PacifiCorp mining complex on East and Trail mountains, coal has been extracted causing the partial collapse of the immediate overburden strata and, ultimately, surface subsidence. This occurs in areas of retreat mining in room and pillar sections and in areas of longwall mining. All areas with potential for subsidence are monitored annually. (See annual Subsidence Monitoring reports.)

The springs and surface waters above all areas of mine workings are being monitored closely to measure the effects of mining. No mining-related changes to the springs or surface waters have been identified in the data collected. The water flowing into the mine workings, although temporarily diverted or detained, has not had an impact on the surface waters of East and Trail mountains or the surrounding area.

IX. SUMMARY

PacifiCorp has been conducting a water monitoring program in the area of its underground coal mines in Emery County, Utah in accordance with federal and state regulations. The program has been in existence since 1977, and this is the thirty-seventh annual report submitted concerning the hydrology.

From 1982 to 1984 the Western United States, especially Utah, experienced an unprecedented wet cycle of precipitation. The pattern changed in 1985 with conditions returning to slightly above normal. During the 1986 water year, the extremely wet trend returned, and the upper Colorado River Basin experienced above average precipitation. The 1987 weather pattern changed dramatically with near normal valley precipitation and mountain snowfall much below normal. The resulting 1987 runoff was substantially below normal. The drought continued from 1988 through 1992 with runoff amounts much below normal for six consecutive years. The 1993 runoff improved substantially with above average flow conditions occurring in most river basins. In 1994, drought conditions returned throughout much of the West. From 1995 through 1999, water supplies were much improved with above average runoff in Emery County. From 2000, through 2004, runoff was much lower than normal. Precipitation was variable during 2001, however, drought followed into 2002. The 2003 water year was nearly as severe as 2002 with flows less than 40%. Finally, in 2005 and 2006 wet conditions returned to the West and resulted in improved water supplies in the Huntington Creek drainage. Most local reservoirs filled to capacity. Extreme drought returned to the region once again in 2007. Below average precipitation and snowfall coupled with dry and hot conditions in March and April resulted in greatly reduced water supplies which, in turn, severely restricted irrigation water supplies during August and September. From 2008 through the 2010 water years, drought conditions eased in the region, filling the reservoirs to capacity, resulting in more abundant water supplies for agriculture and culinary uses. In 2011, near record precipitation occurred. The wet cycle of precipitation mimicked the amounts seen in the early 80's. Spring runoff lasted well into the summer months. Many of the drainages in Emery County swelled beyond their banks. Drought returned in 2012 with recorded precipitation amounts of about 50% that of the 2011 reports. Temperatures were generally above normal for all reporting locations. The 2013 water year started dry, however extremely wet conditions were experienced in March and April and again in August and September. The year ended in normal in both temperature and precipitation. In 2014, conditions were similar to the previous year with above normal temperatures and below normal precipitation. The exception to 2014 was the isolated thunder storms that occurred in August and September recording 200% above normal rainfall amounts.

The water year for 2015, generally experienced below normal precipitation in October and November. Normal to near normal precipitation from December to April, and excessive rainfall in May through July. The water year ended the last two months very dry in most recording stations. In May and June the area experienced rainfall in amount of 200 to 300% of the historical monthly average in all reporting areas. Temperatures were generally above normal throughout the year for all reporting stations.

The data collected in 2015 continued to show the relationship between the variation in surface water quantity and precipitation, but the hydrologic monitoring completed on East Mountain has failed to identify any change in the quantity or quality of ground or surface water which can be attributed to underground mining.

TABLE 1: PRECIPITATION IN EMERY COUNTY, UTAH (2015 Water Year)

	Castle Dale* (Elev. 5800')		Huntington Plant (Elev. 6500')		East Mountain (Elev. 8985')	
	Precip. (inches)	*% of Normal*	*Precip. (inches)*	*% of Normal*	*Precip. (inches)*	*% of Normal*
2014						
October	0.29	32	0.13	10	0.00	0
November	0.28	57	0.21	36	0.62	66
December	0.44	93	0.68	111	0.98	106
2015						
January	0.80	128	0.88	110	1.14	109
February	0.12	21	0.14	21	2.04	170
March	0.52	87	0.57	79	0.09	7
April	0.60	120	0.84	131	0.86	91
May	1.56	264	1.98	208	2.77	309
June	1.10	263	1.52	241	1.86	364
July	1.13	160	1.28	123	1.86	205
August	1.35	144	0.76	63	0.66	50
September	0.65	71	0.09	8	0.21	16
TOTALS	**8.84**	114	**8.99**	89	**13.08**	104
Mean Monthly	0.74	120	0.76	95	1.09	123

NR - No Record

* Tranferred Site from Hunter Plant to Castle Dale

TABLE 2: COMPARISON OF 2014 AND 2015 PRECIPITATION (Inches)

	2015		*2014*		*2015 As*
Station	***Amount***	***% of Normal***	***Amount***	***% of Normal***	***% of 2014***
Castle Dale	8.84	115	7.59	98	116
Huntington Plant	8.99	91	9.29	89	97
East Mountain	13.08	104	11.90	95	110

TABLE 3: CASTLE DALE PRECIPITATION

Elevation - 5,800 Feet

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	ANNUAL
70-71	0.41	0.32	0.22	0.31	0.62	0.00	0.21	0.76	0.16	0.19	0.54	0.05	3.79
71-72	1.63	0.21	0.94	0.00	0.00	0.00	0.47	0.00	0.92	0.17	0.67	0.85	5.86
72-73	2.65	1.17	0.27	0.42	0.71	0.97	1.18	0.23	0.54	0.91	0.42	0.07	9.54
73-74	0.17	0.19	0.14	0.94	0.08	0.09	0.00	0.00	0.05	1.41	0.11	0.25	3.43
74-75	1.89	0.63	0.18	0.29	0.23	0.85	0.06	0.21	1.01	1.34	0.11	0.31	7.11
75-76	0.13	0.36	0.02	0.08	0.42	0.01	1.21	0.86	0.04	0.43	0.13	0.66	4.35
76-77	0.10	0.00	0.00	0.37	0.00	0.00	0.06	1.41	0.09	2.16	0.84	0.36	5.39
77-78	0.31	0.16	0.44	1.39	1.69	1.36	0.60	0.53	0.00	0.15	0.11	0.10	6.84
78-79	0.13	2.68	0.47	1.52	0.66	1.64	0.05	0.74	0.04	0.00	1.50	0.00	9.43
79-80	0.01	0.11	0.26	1.96	1.58	1.12	0.67	1.72	0.04	0.41	1.58	2.63	12.09
10-Year	0.74	0.58	0.29	0.73	0.60	0.60	0.45	0.65	0.29	0.72	0.60	0.53	6.78
80-81	1.23	0.25	0.00	0.01	0.08	1.93	0.15	0.53	0.21	0.74	0.57	1.56	7.26
81-82	1.44	0.31	0.20	1.13	0.09	0.91	0.00	0.12	0.15	0.97	2.16	1.17	8.65
82-83	0.16	0.79	1.06	1.07	0.46	0.96	0.25	0.23	0.30	1.25	0.40	0.74	7.67
83-84	0.49	1.24	1.07	0.22	0.22	0.33	0.36	0.08	0.78	0.95	1.38	0.34	7.46
84-85	1.69	0.21	1.18	0.34	0.16	0.96	1.02	0.72	0.19	1.78	0.11	0.88	9.24
85-86	0.98	1.54	0.55	0.07	0.63	0.55	0.44	0.08	0.26	0.72	1.47	0.78	8.07
86-87	1.08	0.10	0.07	0.48	0.45	0.74	0.53	1.03	0.80	2.50	1.65	0.09	9.52
87-88	1.54	1.02	0.66	1.29	0.00	0.63	1.96	0.82	0.30	0.32	0.71	0.66	9.91
88-89	0.70	0.02	0.49	0.45	0.22	0.42	0.02	0.33	0.42	0.70	2.11	0.56	6.44
89-90	0.17	0.03	0.03	0.23	0.72	0.61	0.38	0.09	0.44	0.68	0.81	1.54	5.73
20-Year	0.85	0.57	0.41	0.63	0.45	0.70	0.48	0.52	0.34	0.89	0.87	0.68	7.39
90-91	0.72	0.00	0.27	0.18	0.12	0.85	0.13	0.92	0.90	0.89	1.01	2.13	8.12
91-92	0.20	0.60	0.13	0.43	1.48	1.11	0.31	1.66	0.26	0.04	0.79	0.92	7.93
92-93	0.62	0.37	0.81	2.32	1.77	1.44	0.45	1.85	0.19	0.03	0.54	0.20	10.59
93-94	1.46	0.68	0.18	0.04	0.40	0.07	0.68	0.35	0.03	0.13	0.91	1.30	6.23
94-95	1.70	0.21	-	0.96	0.24	0.80	1.42	1.69	0.61	0.87	1.42	0.47	10.39
95-96	0.00	0.16	0.19	0.71	0.40	1.47	0.02	0.86	0.44	0.51	0.01	2.06	6.83
96-97	0.73	1.30	0.54	1.17	0.18	0.00	0.91	0.59	1.61	1.13	2.77	2.50	13.43
97-98	0.43	0.38	0.05	0.35	2.04	0.04	0.29	0.13	0.55	1.54	0.86	1.16	7.82
98-99	1.71	0.76	0.00	0.17	0.28	0.00	1.64	0.19	0.54	1.15	2.50	1.14	10.08
99-00	0.00	0.00	0.12	0.41	1.19	0.50	0.03	0.76	0.40	0.28	1.00	0.39	5.08
30-Year	0.82	0.53	0.36	0.64	0.57	0.68	0.52	0.65	0.41	0.81	0.97	0.86	7.81
00-01	2.89	0.09	0.10	1.14	1.03	0.47	0.23	0.53	0.23	0.81	0.82	0.76	9.10
01-02	0.16	0.75	0.17	0.00	0.05	0.02	0.16	0.00	0.26	0.18	0.18	2.55	4.48
02-03	0.78	0.74	0.28	0.02	0.37	1.22	0.08	0.56	0.12	0.00	0.87	0.30	5.34
03-04	0.29	0.56	0.91	0.30	1.84	0.00	2.02	0.10	0.82	0.41	0.39	1.03	8.67
04-05	2.14	1.67	0.51	2.01	1.11	0.17	0.19	0.40	2.11	0.15	0.58	1.00	12.04
05-06	1.37	0.26	0.06	0.61	0.16	1.51	0.13	0.03	0.19	0.32	0.83	0.42	5.89
06-07	3.80	0.01	0.43	0.40	0.01	0.24	0.52	0.40	0.05	0.43	3.04	1.22	10.55
07-08	0.43	0.03	1.33	0.49	0.93	0.00	0.11	0.50	0.35	0.03	0.29	0.68	5.17
08-09	0.36	0.22	0.91	0.07	0.37	0	0.59	0.7	0.69	0.07	0.21	0.6	4.79
09-10	0.32	0.00	1.53	1.46	0.8	0.65	0.1	0.17	0.46	0.13	0.3	0.1	6.02
40-Year	0.93	0.50	0.43	0.65	0.59	0.62	0.49	0.57	0.44	0.67	0.92	0.86	7.66
10-11	2.09	0.29	1.79		0.65	0.25	0.36	1.56	0.81	1.73	0.62	0.66	10.81
11-12	0.39	0.19	0.78	0.47	0.56	0.00	0.08	0.00	0.00	1.05	0.35	0.82	4.69
12-13	0.39	0.19	0.78	0.35	0.16	1.09	1.61	0.65	0	-	1.6	2.78	9.60
13-14	0.43	0.78	0.22	0.26	0.13	0.29	0.36	0.92	0.02	0.76	1.94	1.48	7.59
14-15	0.29	0.28	0.44	0.8	0.12	0.52	0.6	1.56	1.1	1.13	1.35	0.65	8.84
Average*	0.92	0.49	0.47	0.63	0.57	0.60	0.50	0.59	0.42	0.71	0.94	0.92	7.71

* Historical Average. Does not include current report year.

TABLE 4: HUNTINGTON PLANT PRECIPITATION

Elevation - 6,500 Feet

Water Year	*OCT*	*NOV*	*DEC*	*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEPT*	*TOTAL*
70-71	---	---	---	---	---	0.08	0.29	0.16	0.11	0.57	0.63	0.43	2.27
71-72	2.26	0.59	1.62	0.04	0.00	0.32	0.28	0.16	0.77	0.40	0.66	1.07	8.17
72-73	4.27	1.28	0.34	0.49	0.80	2.42	0.50	0.17	0.97	1.09	1.94	0.12	14.39
73-74	0.08	0.02	0.37	0.20	0.03	0.01	0.00	0.00	0.00	0.09	0.00	0.07	0.87
74-75	0.68	1.19	1.13	1.01	0.30	0.80	0.03	0.75	1.44	2.62	0.31	0.24	9.50
75-76	0.23	0.95	0.03	0.20	0.23	0.00	2.34	0.86	0.02	0.73	0.19	0.85	6.63
76-77	0.56	0.00	0.00	0.35	0.00	0.00	0.00	1.76	0.00	2.08	0.96	0.70	6.41
77-78	0.66	0.12	0.82	1.45	1.00	1.36	0.94	0.72	0.12	0.05	0.72	0.77	8.73
78-79	0.02	2.65	0.25	1.21	0.52	2.50	0.00	0.84	0.05	0.09	3.32	0.20	11.65
79-80	0.17	0.14	0.15	2.88	3.63	0.68	1.13	1.88	0.65	0.18	0.38	2.22	14.09
80-81	1.20	0.06	0.00	0.00	0.00	0.62	0.08	1.75	0.48	0.00	0.58	1.53	6.30
81-82	1.12	0.25	1.30	1.63	0.20	0.73	0.00	0.17	0.00	0.08	0.71	1.91	8.10
82-83	0.20	0.60	0.67	0.16	0.65	1.87	0.08	0.40	0.00	1.61	0.39	1.15	7.78
83-84	0.76	0.76	2.13	0.10	0.15	1.18	0.72	0.17	1.04	0.74	1.39	0.46	9.60
84-85	2.07	0.34	1.74	0.49	0.27	0.53	0.44	1.08	0.42	3.21	0.04	0.81	11.44
85-86	0.77	1.28	0.64	0.01	0.98	0.28	0.43	0.10	0.17	0.42	0.55	1.08	6.71
86-87	0.38	0.15	0.05	0.81	0.66	0.13	1.22	1.48	1.01	2.14	0.65	0.00	8.68
87-88	1.36	1.35	0.51	1.77	0.00	0.10	1.35	0.94	0.83	0.04	0.13	0.92	9.30
88-89	0.31	0.13	0.83	0.68	0.28	0.21	0.20	0.22	1.28	0.78	1.72	0.74	7.38
89-90	0.21	0.28	0.42	0.51	1.18	0.94	1.30	1.35	0.65	1.30	1.27	2.35	11.76
90-91	0.45	0.03	0.43	0.44	0.37	0.68	0.13	3.13	0.60	1.14	1.87	2.38	11.61
91-92	0.21	0.99	0.37	1.20	1.98	1.55	0.47	1.92	1.97	2.99	1.53	0.60	15.78
92-93	1.93	1.02	1.67	2.32	1.71	1.87	0.46	0.65	0.31	0.08	1.68	0.46	14.16
93-94	2.11	0.88	0.23	0.12	0.88	1.17	1.69	0.53	0.05	Tr.	2.14	1.69	11.49
94-95	1.33	0.26	0.33	1.10	0.26	1.05	2.65	2.67	1.17	0.32	2.81	1.48	15.42
95-96	NA	NA	0.90	1.10	0.86	1.52	0.46	1.41	0.72	1.15	0.19	2.18	-----
96-97	0.69	1.31	0.63	1.61	0.05	0.00	0.90	1.11	1.20	2.31	3.28	2.49	15.58
97-98	1.92	0.53	0.00	1.27	1.89	0.15	1.13	1.28	0.90	1.27	1.17	1.60	13.11
98-99	2.59	2.29	0.00	0.48	0.37	0.00	2.11	0.29	0.74	1.91	3.41	1.47	15.66
99-00	0.00	0.05	0.10	0.33	1.06	0.88	0.13	0.89	1.83	0.86	2.19	0.80	9.12
00-01	3.04	0.07	0.26	1.69	1.09	0.85	0.46	NR	NR	NR	NR	NR	
01-02	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
02-03	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
03-04	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
04-05	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
05-06	0.82	0.74	0.80	1.40	0.39	0.00	0.00	0.67	0.22	0.62	2.11	0.72	8.49
06-07	4.47	0.09	0.32	0.35	0.25	0.58	0.40	0.64	1.07	0.71	0.32	0.35	9.55
07-08	0.94	0.01	0.97	0.67	1.42	0.04	0.02	1.10	0.42	0.40	0.58	0.78	7.35
08-09	0.30	0.49	0.18	0.42	0.56	0.00	0.79	0.96	1.95	0.62	1.09	0.58	7.94
09-10	0.49	0.03	0.49	1.22	0.88	0.56	0.03	0.34	0.36	0.27	0.09	0.06	4.82
*10-11***	3.38	0.18	2.19	0.37	0.45	0.59	0.59	2.20	0.50	2.47	1.22	0.81	14.95
11-12	3.20	0.59	0.14	0.19	0.35	0.59	0.43	0.00	0.01	1.72	0.51	0.79	8.52
12-13	0.70	0.12	0.27	0.20	0.13	1.15	0.81	0.67	0.00	1.46	3.30	3.77	12.58
13-14	0.47	0.70	0.04	0.19	0.63	0.44	0.63	0.56	0.04	0.61	2.23	2.74	9.28
14-15	0.13	0.21	0.68	0.88	0.14	0.57	0.84	1.98	1.52	1.28	0.76	0.09	9.08
Average*	**1.22**	**0.59**	**0.60**	**0.79**	**0.68**	**0.71**	**0.64**	**0.94**	**0.62**	**1.03**	**1.24**	**1.11**	**9.87**

* Historical Average. Does not include current report year.

TABLE 5: ELECTRIC LAKE PRECIPITATION

Elevation - 8,350 Feet

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	TOTAL
70-71	2.46	2.35	6.41	1.13	1.66	0.36	1.05	0.66	0.47	0.40	2.15	0.78	19.88
71-72	3.49	1.69	4.07	3.35	0.58	0.70	1.02	0.28	1.49	0.70	0.80	2.91	21.08
72-73	4.18	3.43	3.27	0.97	2.09	2.74	3.67	1.42	0.85	0.82	1.23	1.15	25.82
73-74	0.79	1.90	3.52	2.70	1.12	1.52	2.49	0.20	0.13	2.09	0.06	0.09	16.61
74-75	2.27	0.62	1.73	2.10	2.37	3.42	1.23	3.21	1.08	1.93	0.49	0.25	20.70
75-76	1.31	2.57	0.82	1.44	2.23	1.35	1.47	2.00	1.23	1.07	0.54	1.19	17.22
76-77	1.00	0.25	0.14	0.76	1.14	2.00	0.05	3.00	0.90	2.28	1.31	1.26	14.09
77-78	1.47	2.10	3.20	3.68	2.74	3.16	2.46	1.18	0.30	0.10	0.24	0.77	21.40
78-79	0.40	3.18	2.66	2.90	2.18	2.53	0.72	1.67	0.19	0.96	2.29	0.32	20.00
79-80	1.55	2.23	0.37	4.95	6.01	3.34	1.27	3.09	0.12	0.37	0.38	1.80	25.48
10-Year	1.89	2.03	2.62	2.40	2.21	2.11	1.54	1.67	0.68	1.07	0.95	1.05	20.23
80-81	1.45	0.98	0.32	1.30	1.04	3.20	1.45	3.06	0.39	1.61	2.73	1.44	18.97
81-82	4.18	1.44	4.79	5.26	1.66	5.06	1.11	1.40	0.59	1.26	2.29	5.38	34.42
82-83	1.88	3.68	2.76	2.41	4.00	4.30	2.35	2.81	1.35	1.34	1.50	2.88	31.26
83-84	2.15	4.81	7.43	1.27	1.56	2.77	3.23	1.73	3.41	2.55	2.26	1.47	34.64
84-85	2.92	2.63	3.24	1.54	1.09	3.54	1.95	1.19	0.89	3.04	0.03	4.35	26.41
85-86	4.40	6.62	1.99	1.81	8.54	2.48	3.79	1.62	0.26	1.01	1.68	2.73	36.93
86-87	1.86	1.98	0.55	2.14	2.07	2.47	1.03	2.93	0.79	2.12	1.22	0.49	19.65
87-88	1.39	1.68	3.50	3.06	0.72	3.32	2.14	1.60	0.86	1.04	2.23	1.16	22.70
88-89	1.20	2.68	1.91	1.52	1.99	3.55	0.35	0.06	1.54	1.43	1.37	1.19	18.79
89-90	1.21	1.88	0.70	2.00	4.06	2.30	2.00	0.81	1.87	1.08	0.62	1.87	20.40
20-Year	2.08	2.44	2.67	2.31	2.44	2.71	1.74	1.70	0.94	1.36	1.27	1.67	23.32
90-91	1.32	0.90	1.64	1.49	1.64	4.24	3.06	2.60	0.57	1.04	1.39	2.70	22.56
91-92	1.43	2.10	0.87	0.72	2.21	1.95	0.54	1.55	1.01	0.59	1.64	1.02	15.63
92-93	1.51	1.33	3.60	5.01	4.76	2.25	2.49	2.40	1.57	0.48	1.32	0.60	27.32
93-94	2.10	2.19	0.90	1.00	4.00	1.10	2.81	0.99	0.10	0.25	0.75	2.32	18.51
94-95	2.40	4.26	1.60	3.25	1.90	3.84	3.94	5.07	2.04	1.00	2.53	1.95	33.78
95-96	1.54	1.38	3.54	5.84	3.25	3.23	1.75	1.73	0.90	1.09	0.45	2.20	26.90
96-97	1.43	2.35	3.90	4.00	1.31	0.77	1.97	2.03	1.03	0.64	1.98	4.45	25.86
97-98	2.30	1.88	2.00	3.65	3.60	2.86	1.80	1.82	2.30	2.01	1.86	1.68	27.76
98-99	3.65	2.98	1.15	4.05	1.70	1.44	4.95	2.03	1.28	2.90	3.54	1.20	30.87
99-00	0.15	0.38	1.61	4.19	4.45	1.98	0.66	2.12	2.32	0.00	2.60	1.65	22.11
30-Year	1.98	2.28	2.47	2.65	2.59	2.59	1.96	1.88	1.06	1.24	1.45	1.78	23.93
00-01	3.47	1.21	2.19	1.54	2.80	0.79	2.41	1.49	0.37	1.56	3.40	1.01	22.24
01-02	1.35	3.40	1.12	1.08	0.82	2.31	1.68	0.40	0.35	0.58	0.20	3.60	16.89
02-03	2.64	2.08	2.69	0.25	2.07	2.89	2.72	1.47	0.80	0.33	2.24	0.59	20.77
03-04	0.66	2.49	3.71	2.12	2.69	0.66	2.19	0.12	1.30	0.72	0.39	0.45	17.50
04-05	4.35	2.59	2.05	3.94	2.53	2.01	1.41	1.90	1.26	0.65	1.23	1.40	25.32
05-06	1.53	2.26	3.92	2.92	1.70	5.59	4.72	0.50	0.95	0.90	1.03	1.88	27.90
06-07	3.49	2.52	1.06	0.43	2.48	1.80	1.40	1.44	0.73	1.70	2.18	1.62	20.85
07-08	2.45	1.60	4.07	NA	NA	NA	NA	NA	1.15	1.47	0.30	0.87	11.91
08-09*	-	-	-	-	-	-	-	-	-	-	-	-	-
09-10*	-	-	-	-	-	-	-	-	-	-	-	-	-
40-Year	2.09	2.28	2.50	2.48	2.51	2.54	2.04	1.72	1.02	1.19	1.43	1.70	23.19
10-11*	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12*	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13*	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14*	-	-	-	-	-	-	-	-	-	-	-	-	-
Average**	2.09	2.28	2.50	2.48	2.51	2.54	2.04	1.72	1.02	1.19	1.43	1.70	23.19

NOTE: Climatic Station was moved from a point one mile above the dam site to a point 500 feet below dam site on November 15, 1973.
October, November, and December 70-71 were estimated by correlation with Clear Creek Weather Station. Site permanantly removed in 2008.

* No Precipitation data was collected from Electric Lake site.
** Historical Average. Does not include current report year.

TABLE 6: EAST MOUNTAIN PRECIPITATION

Elevation - 8,985 Feet

Water Year	*OCT*	*NOV*	*DEC*	*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEPT*	*TOTAL*
80-81	1.28	0.39	0.05	0.29	0.52	2.77	0.64	0.87	0.11	0.57	0.85	2.55	10.90
81-82	1.93	0.53	0.97	3.22	0.14	1.67	0.00	0.45	0.09	1.86	1.10	2.61	14.57
82-83	0.38	2.90	1.39	1.30	1.81	1.98	0.92	0.71	0.61	1.27	4.83	1.62	19.71
83-84	0.76	2.43	2.42	0.27	0.65	1.22	0.50	0.22	1.18	1.90	2.33	0.64	14.53
84-85	3.27	0.97	1.67	0.49	0.59	1.77	1.35	1.73	0.28	2.47	0.12	2.31	17.02
85-86	1.15	2.38	0.87	0.30	2.10	1.43	1.05	0.38	0.53	0.87	2.24	1.63	14.92
86-87	1.57	0.39	0.16	1.37	1.37	1.65	1.16	1.77	0.58	2.49	1.16	0.06	13.73
87-88	2.77	1.91	1.29	1.42	0.00	0.99	2.08	1.03	0.81	0.45	0.96	0.91	14.61
88-89	0.61	0.43	1.56	1.00	0.68	1.03	0.26	0.47	0.43	1.19	2.44	0.49	10.59
89-90	0.28	0.39	0.16	0.74	2.08	1.75	1.03	0.26	0.67	0.88	1.03	1.62	10.90
10-Year	1.40	1.27	1.05	1.04	0.99	1.63	0.90	0.79	0.53	1.40	1.71	1.44	14.15
90-91	0.48	0.26	0.66	0.34	0.39	2.34	0.59	1.83	0.21	1.01	1.48	3.11	12.69
91-92	0.49	1.07	0.07	0.61	1.73	2.39	0.56	2.19	0.95	0.85	0.48	0.35	11.74
92-93	1.57	0.57	1.53	4.10	2.34	2.01	0.33	0.72	0.19	0.04	0.82	0.14	14.37
93-94	2.23	1.12	0.14	0.32	1.35	0.34	2.65	0.36	0.39	0.10	0.83	1.49	11.33
94-95	1.86	1.42	0.65	1.37	0.66	0.79	3.75	2.29	1.19	0.34	1.52	0.62	16.46
95-96	0.18	0.46	0.64	1.39	1.18	2.23	0.21	1.14	0.30	0.58	0.35	3.46	12.12
96-97	1.50	1.63	1.66	2.49	1.56	0.00	0.40	0.91	0.15	0.15	1.30	2.43	11.75
97-98	0.24	0.84	0.23	0.97	3.34	0.71	0.81	0.37	0.04	0.78	0.57	2.16	11.06
98-99	3.01	1.08	0.00	0.75	0.34	0.07	2.82	0.36	1.21	2.08	2.24	0.78	14.73
99-00	0.04	0.05	0.28	0.48	3.27	1.56	0.15	0.72	0.59	0.03	2.03	0.96	10.16
20-Year	1.28	1.06	0.82	1.16	1.30	1.43	1.06	0.94	0.53	1.00	1.43	1.50	13.39
00-01	3.48	0.62	0.39	1.96	1.21	1.03	1.12	1.39	0.19	0.58	1.09	0.12	13.17
01-02	0.11	0.40	0.18	0.03	0.19	0.10	0.16	0.00	0.06	0.26	0.69	4.15	6.34
02-03	0.73	0.82	0.75	0.01	0.96	1.20	0.37	0.57	0.37	0.06	1.59	0.94	8.36
03-04	0.27	0.86	1.95	0.21	2.73	0.00	1.94	0.12	1.27	0.49	0.67	0.38	10.89
04-05	2.56	2.06	1.16	3.47	1.41	0.63	1.19	1.04	1.36	0.44	0.83	1.07	17.22
05-06	1.44	0.64	0.98	0.87	0.41	3.67	0.44	0.03	0.55	0.58	0.50	0.48	10.59
06-07	3.66	0.21	0.48	0.25	0.18	0.96	0.98	0.19	0.05	0.70	0.89	0.99	9.54
07-08	0.87	1.74	1.44	0.95	1.36	0.27	0.47	1.06	0.17	0.16	1.53	0.12	10.14
08-09	0.47	0.54	1.51	0.42	1.48	0.18	0.93	2.10	1.26	0.49	0.75	0.45	10.58
09-10	0.34	0.14	1.52	2.09	1.04	1.16	0.43	0.59	0.79	0.50	0.60	0.00	9.20
30-Year	1.32	0.98	0.89	1.12	1.24	1.26	0.98	0.86	0.55	0.81	1.26	1.29	12.46
10-11	3.06	0.54	3.86	0.16	1.34	0.90	0.77	2.65	0.57	2.47	1.15	0.86	18.33
11-12	0.86	0.59	0.53	0.75	0.95	0.65	0.44	0.00	0.05	2.65	1.29	0.78	9.53
12-13	0.63	0.07	0.04	0.58	0.53	1.66	1.37	0.65	0.00	0.64	2.33	3.53	12.03
13-14	0.42	1.29	0.24	0.57	0.77	0.45	0.36	1.35	0.16	0.88	2.67	2.74	11.90
14-15	0.00	0.62	0.98	1.14	2.04	0.09	0.86	2.77	1.86	1.86	0.66	0.21	13.08
Average*	**1.31**	**0.93**	**0.92**	**1.05**	**1.20**	**1.22**	**0.95**	**0.90**	**0.51**	**0.91**	**1.33**	**1.37**	**12.52**

* Historical average values. Does not include current report year.

TABLE 7: TEMPERATURES IN EMERY COUNTY, UTAH (2015 Water Year)

	Castle Dale**		Huntington Plant		East Mountain	
2014	***Average Temperature****	***Departure From Normal***	***Average Temperature****	***Departure From Normal***	***Average Temperature****	***Departure From Normal***
October	53.06	3.9	52.8	4.1	46.1	4.4
November	35.78	-0.3	36.2	-1.3	30.3	0.5
December	30.92	5.7	29.1	2.3	22.6	0.3
2015						
January	32.36	9.1	32.7	4.9	30.6	6.2
February	38.84	8.7	38.2	8.1	26.1	1.3
March	45.86	5.5	45.2	6.0	44.6	12.8
April	47.66	0.2	46.1	1.3	40.0	1.9
May	54.86	-1.6	51.7	-3.0	44.4	-3.4
June	70.16	4.9	69.7	1.5	63.7	5.6
July	70.34	-1.3	68.9	-3.6	62.7	-2.6
August	71.06	1.7	69.8	2.1	68.9	5.5
September	65.30	4.3	66.2	4.5	65.2	10.7
AVERAGE	51.4	3.4	50.6	2.2	45.4	3.6

* Temperatures reported in degrees Fahrenheit.
** Tranferred Site from Hunter Plant to Castle Dale in 2008

TABLE 8: COMPARISON OF 2013 AND 2014 TEMPERATURES*

	2014		*2015*		*2015*
Station	***Average Temperature***	***Departure From Normal***	***Average Temperature***	***Departure From Normal***	***Departure From 2014***
Castle Dale	49.2	0.9	51.4	3.4	2.2
Huntington Plant	48.7	0.6	50.6	2.2	1.8
East Mountain	32.7	1.7	45.4	3.6	12.7
Average Departure From Normal		1.1		3.1	

* Temperatures reported in degrees Fahrenheit.

TABLE 9: HUNTINGTON CREEK WATER FLOWS (2015 Water Year)

	Huntington Creek Below Electric Lake	***Huntington Creek At Plant***
Total Yearly Flow (Acre Feet)	8,030	35,044
Mean Discharge in Cubic Feet Per Second (CFS)	12.5	51.2
Maximum Discharge (CFS)	35.8	138.2
Date of Maximum Discharge	25-Apr-15	03-Jun-15
Minimum Discharge (CFS)	5.1	10.1
Date of Minimum Discharge	13-Nov-14 3-Jan-15	27-Dec-14

TABLE 10: DISCONTINUED

TABLE 11: HUNTINGTON CREEK WATER QUALITY *

HCC01 - ABOVE POWER PLANT

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150311	0	220	52.4	0	15	521		234	0.52	0	25.03	0	0	8.4	1.81	12.12	51	32	319
20150603	0	182	51.48	0	5	384		191	1.3	0	15.29	0	0	8.52	0.73	4.36	18	323	249
20150916	0	155	45.47	0	6	358		174	0.38	0	14.58	0.008	0	8.33	1.09	6.56	21	47	200
20151210	0	214	55.23	0	13	478	8.7	246	0.15	0	26.32	0	0	8.25	1.83	11.2	50	0	327
No. of Analysis	4	4	4	4	4	4	1	4	4	4	4	4	4	4	4	4	4	4	4
2014**																			
MIN	0	186	52	0	4	386	0	190	0	0	14	0	0	8	1	4	18	23	223
MAX	0	233	65	0	19	662	0	289	1	0	31	0	0	9	2	20	85	108	365
MEAN	0	204	58	0	12	504	0	238	0	0	23	0	0	8	2	11	46	62	289
2013**																			
MIN	0	162	51	0	5	384	0	191	0	0	15	0	0	8	1	5	20	13	203
MAX	0	208	62	9	13	546	0	272	2	0	29	0	0	9	2	13	51	161	307
MEAN	0	186	58	2	10	455	0	232	1	0	21	0	0	9	1	9	35	70	253
2012**																			
MIN	0	143	48	0	5	327	0	167	0	0	11	0	0	8	1	5	12	8	183
MAX	0	251	73	10	16	602	0	320	1	0	34	0	0	9	2	13	61	85	329
MEAN	0	183	58	3	10	435	0	230	0	0	21	0	0	9	1	8	33	29	243
2011**																			
MIN	0	143	48	0	5	327	0	167	0	0	11	0	0	8	1	5	12	8	183
MAX	0	251	73	10	16	602	0	320	1	0	34	0	0	9	2	13	61	85	329
MEAN	0	183	58	3	10	435	0	230	0	0	21	0	0	9	1	8	33	29	243
2010**																			
MIN	0	155	45	0	3	321	8.80	164	0.09		11.55	0.00		8.47	0.73	4	13	9	188
MAX	0	211	62	15	15	539	11.00	272	1.43		28.86	0.00		8.61	1.70	14	58	128	322
MEAN	0	181	54	4	9	431	9.63	219	0.48		20.27	0.00		8.53	1.25	8	35	50	257
2009**																			
MIN	0	154	47	0	5	358	8	189	0		14	0		8	1	4	19	5	219
MAX	0	218	65	7	16	563	9	289	0		31	0		9	2	13	59	13	341
MEAN	0	184	56	3	10	454	9	235	0		23	0		9	1	9	40	10	278
2008**																			
MIN		144	52.7	0.0	4.0	361	7.80	185	0.12		12.94	0.01		8.34	0.78	3.89	15.0	0.0	229
MAX		216	65.8	15.0	20.0	630	15.10	306	1.05		34.36	0.07		8.60	2.08	15.49	83.0	11.0	399
MEAN		181	58.5	7.7	11.0	498	10.73	243	0.39		23.53	0.03		8.51	1.52	9.11	45.8	5.7	296
2007**																			
MIN		152	49	8	5	401	10.89	188	0.13		16	0.01		8.23	0.70	4	18	13	193
MAX		207	61	8	12	599	13.12	260	0.30		27	0.03		8.51	1.68	11	54	19	301
MEAN		181	56	8	9	486	11.80	226	0.23		21	0.02		8.40	1.39	7	36	15	250
2006**																			
MIN		157	47		5	387	11.61	177	0.12		14	0.00		7.99	0.75	4	19	8	209
MAX		233	73		20	701	14.32	324	8.77		35	0.02		8.43	1.93	18	85	969	467
MEAN		198	61		11	531	13.17	252	2.34		24	0.01		8.19	1.32	10	47	251	306
2005**																			
MIN		161	49		3	362	9.42	178	0.08		14	0.01		8.28	0.69	3	15	14	204
MAX		221	65		21	641	12.43	291	0.49		31	0.05		8.45	2.36	18	66	38	366
MEAN		193	58		10	484	10.87	232	0.27		21	0.02		8.34	1.46	10	38	28	280
2004**																			
MIN		154	44	6	5	332	5.27	173	0.12		15	0.01		8.41	0.84	5	17	13	153
MAX		245	59	6	15	485	14.66	245	0.28		24	0.09		8.63	1.74	13	45	37	287
MEAN		196	53	6	9	425	10.27	215	0.22		20	0.05		8.48	1.25	8	33	23	237
HISTORICAL 1990-2014																			
MIN	0.0	126	32.7	0.0	1.0	210.0	3.8	118	0.01	0.00	9.00	0.00	0.0	7.10	0.01	1.00	2.0	0.00	134
MAX	25.0	400	102.6	38.0	45.0	701.0	15.1	392	13.30	0.25	44.70	0.30	7.0	8.90	5.00	55.00	130.0	969.00	467
MEAN	3.8	211.6	56.6	4.5	11.8	417.4	8.7	222.63	0.48	0.06	19.76	0.04	1.7	8.41	1.36	8.26	32.8	33.66	242.37

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater than laboratory minimum detection limit.

TABLE 12: HUNTINGTON CREEK WATER QUALITY *

HCC02 - @ POWER PLANT (BELOW DEER CREEK CONFLUENCE)

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (mmhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150311	0	218	59	0	17	525		255	0	0	26	0	0	8	2	13	45	28	356
20150603	0	182	52	0	6	389		196	3	0	16	0	0	8	1	5	17	295	239
20150916	0	156	44	0	5	349		163	1	0	13	0	0	9	1	6	22	57	206
20151210	0	212	55	0	13	479	9	246	0	0	27	0	0	10	2	12	56	0	330
No. of Analysis	4	4	4	4	4	4	1	4	4	4	4	4	4	4	4	4	4	4	4
2014																			
MIN	0	181	52	0	5	402	0	196	0	0	15	0	0	8	1	5	21	14	236
MAX	0	243	61	0	31	757	0	296	1	0	35	0	0	9	3	32	101	138	426
MEAN	0	206	57	0	18	553	#DIV/0!	246	0	0	25	0	0	9	2	17	56	71	321
2013**																			
MIN	0	160	51	0	6	391	0	192	0	0	16	0	0	8	1	6	23	12	209
MAX	0	207	62	0	27	597	0	274	2	0	29	0	0	9	3	23	64	156	348
MEAN	0	186	57	0	17	494	0	236	1	0	23	0	0	9	2	14	41	68	273
2012**																			
MIN	0	171	54	0	7	388	0	203	0	0	17	0	0	8	1	8	24	0	226
MAX	0	209	62	31	29	711	0	303	1	0	39	0	0	9	4	37	96	119	399
MEAN	0	192	57	11	17	524	0	247	0	0	25	0	0	9	2	18	50	46	301
2011**																			
MIN	0.0	148.0	49.3	0.0	6.0	332.0	0.0	172.0	0.2	0.0	11.9	0.0	0.0	8.5	0.8	5.3	13.0	0.0	191.0
MAX	0.0	251.0	70.6	19.0	18.0	660.0	0.0	331.0	1.3	0.0	37.6	0.0	0.0	8.6	2.9	21.7	82.0	98.0	382.0
MEAN	0.0	184.5	58.1	4.8	11.8	464.5	0.0	237.0	0.4	0.0	22.3	0.0	0.0	8.5	1.7	11.9	41.0	33.0	265.8
2010**																			
MIN	0	150	47	0	4	326	8.70	170	0.09		12	0.00		8.48	0.80	4	14	6	194
MAX	0	221	59	21	36	687	10.90	291	1.62		35	0.00		8.62	3.54	36	85	134	414
MEAN	0	185	53	5	17	496.5	9.65	226	0.52		23	0.00		8.55	2.11	18	48	45	293
2009**																			
MIN	0	155	47	0	7	370	8	194	0		15	0		8	1	6	22	10	229
MAX	0	227	64	9	33	686	9	306	0		35	0		9	3	28	78	17	422
MEAN	0	189	56	2	17	516	8	246	0		26	0		9	2	16	53	14	319
2008**																			
MIN									0.12			0.00			0.92				
MAX		227	64	9	33	686	9.20	306	4.00		35			8.61	4.00	28	78	17	422
MEAN		144	43	4	15	393.875	7.42	187.4375	1.14		20	1.00		7.39	2.50	13	39	11	243
2007**																			
MIN		158	48	10	5	412	10.15	185	0.14		16	0.01		8.27	1	4	19	8	192
MAX		215	61	10	22	681	14.04	270	0.24		29	0.03		8.56	2	19	66	15	330
MEAN		187	55	10	12	514.75	11.83	228.5	0.19		22	0.02		8.41	2	10	40	11	261
2006**																			
MIN		157	47		6	400	11.50	179	0.10		15	0.00		8.07	1	5	20	8	215
MAX		235	73		76	899	14.31	332	11.93		36	0.01		8.48	2	51	86	1420	498
MEAN		200	61		27	596.5	13.31	258.25	3.10		25	0.01		8.31	1	20	48	363	318
2005**																			
MIN		164	48	5	4	372	9.49	182	0.08		15	0.01		8.34	1	5	17	8	223
MAX		220	63	5	32	674	14.78	284	0.38		31	0.05		8.48	2	29	73	37	389
MEAN		194	56	5	14	498	11.79	229.75	0.23		22	0.02		8.40	2	14	41	26	289
2004**																			
MIN		153	45	6	6	336	5.61	177	0.15		16			8.29	1	5	18	12	166
MAX		226	58	6	51	609	14.61	248	0.57		25			8.59	2	32	47	41	368
MEAN		192	53	6	20	463.5	10.25	217.25	0.34		20			8.42	1	15	35	26	265
HISTORICAL 1990-2014																			
MIN	0	148	32	0	1	210	3.8	129	0.01	0	8	0	0	7.14	0.01	1	4	0	161
MAX	33	310	91.7	37	76	899	15	448	11.93	0.21	39.9	1	5.1	8.98	5	51.2	150	1420	498
MEAN	3.9	215.2	57.8	4.4	15.5	458	8.6	234.5	0.5	0.1	21.5	0.1	1.6	8.4	1.7	11.7	41.2	38.8	268.1

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 13: HUNTINGTON CREEK WATER QUALITY *

HCC04 - @ RESEARCH FARM

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150311	0	216	57.62	0	20	540		254	0.35	0	25.66	0	0	8.44	1.6	14	51	28	342
20150603	0	181	58.91	0	6	400		202	1.98	0	16.3	0	0	8.5	0.79	5.2	19	302	236
20150916	0	158	45.07	0	6	363		174	0.34	0	14.98	0.009	0	8.59	1.02	6.77	23	56	216
20151210	0	214	58.33	0	18	543	8.6	273	0.11	0	20.48	0	0	9.51	2.51	18.62	80	105	379
No. of Analysis	4	4	4	4	4	4	1	4	4	4	4	4	4	4	4	4	4	4	4
2014**																			
MIN	0	180	54	0	6	397	0	198	0	0	15	0	0	8	1	6	22	11	235
MAX	0	220	61	0	31	692	0	286	1	0	33	0	0	9	3	27	84	148	398
MEAN	0	198	57	0	19	537	#DIV/0!	246	0	0	25	0	0	9	2	16	53	81	317
2013**																			
MIN	0	159	51	0	7	408	0	194	0	0	16	0	0	8	1	7	26	23	219
MAX	0	215	63	0	35	638	0	285	2	0	31	0	0	9	3	29	71	233	362
MEAN	0	188	56	0	21	518		238	1	0	24	0	0	9	2	18	47	88	290
2012**																			
MIN	0	172	53	0	8	392	0	200	0	0	17	0	0	8	1	8	26	0	229
MAX	0	212	63	26	36	745	0	321	1	0	41	0	0	9	4	39	108	136	409
MEAN	0	193	58	9	19	539	0	253	0	0	26	0	0	9	2	19	55	45	301
2011**																			
MIN	0.0	150.0	49.6	0.0	6.0	335.0	0.0	174.0	0.1	0.0	12.1	0.0	0.0	8.4	0.8	5.6	14.0	7.0	198.0
MAX	0.0	257.0	74.1	0.0	27.0	685.0	0.0	339.0	1.2	0.0	37.5	0.0	0.0	8.6	2.6	24.1	83.0	98.0	415.0
MEAN	0.0	192.3	59.0	0.0	15.8	482.5	0.0	241.0	0.5	0.0	22.8	0.0	0.0	8.5	1.6	13.4	43.8	42.5	284.5
2010**																			
MIN		158	48	0	4	327	8.70	167	0.08	0.00	12	0.00	0.00	8.45	0.82	5	15	7	188
MAX		216	59	26	37	690	10.80	291	1.78	0.00	35	0.00	0.00	8.61	3.36	36	88	142	411
MEAN		192	52	7	18	501.25	9.63	223.75	0.55	0.00	23	0.00	0.00	8.54	2.00	18	51	48	297
2009**																			
MIN		149	47	0	7	376	8	197	0	0	16	0	0	8	1	6	23	5	234
MAX		226	67	13	45	737	9	325	0	0	38	0	0	9	3	34	95	21	450
MEAN		187	57	7	24	556	9	258	0	0	28	0	0	9	2	21	61	13	341
2008**																			
MIN									0.00			0.00			0.92				
MAX		226	67		45	737	9.20	325	4.00		38	4.00		8.60	4.00	34	95	21	450
MEAN		142	44		20	418.1875	7.47	195.875	1.10		21	1.00		7.38	2.48	16	46	11	257
2007**																			
MIN		161	49		7	428	10.18	189	0.15		16	0.01		8.31	1	6	23	8	208
MAX		212	62		25	700	13.79	279	0.26		31	0.03		8.59	3	22	73	38	370
MEAN		187	56.5		15.0	536.25	11.99	235.75	0.20		22.99	0.02		8.44	1.60	12.36	45.8	19.0	283.25
2006**																			
MIN		159	48		8	420	11.58	184	0.12		16	0.01		8.02	1	7	25	6	215
MAX		235	78		104	1036	14.59	366	16.43		42	0.01		8.50	3	70	109	1370	589
MEAN		199	63		38	663	13.52	274	4.46		28	0.01		8.33	2	27	61	358	351
2005**																			
MIN		163	48		4	378	9.07	186	0.10		15	0.00		8.06	1	5	19	38	225
MAX		215	68		48	784	12.69	312	0.42		35	0.05		8.47	2	34	97	57	459
MEAN		191	59		21	545	10.34	244	0.26		24	0.02		8.32	1	16	53	45	323
2004**																			
MIN		153	45	6	7	360	5.46	179	0.11		16	0.02		8.41	1	7	22	15	205
MAX		248	60	7	54	640	14.64	262	0.46		27	0.03		8.61	2	33	65	40	384
MEAN		198	55	7	23	493	10.25	226	0.25		22	0.02		8.49	1	16	44	24	287
HISTORICAL 1991-2014																			
MIN	0.0	96	35.3	0.0	2.0	220	4.2	145	0.00	0.00	9.90	0.000	0.0	7.35	0.01	2.00	9.0	0.00	170
MAX	25.0	326	92.0	44.0	104.0	1036	14.7	397	16.43	0.37	42.00	0.30	5.0	8.94	10.70	69.70	170.0	1370.00	589
MEAN	3.6	215	58.8	4.8	19.6	491	8.5	242.7	0.58	0.07	23.20	0.04	1.6	8.43	1.80	14.76	53.2	41.47	295.28

* Quality parameters are reported as mg/l unless otherwise noted.

**Data: Database input restricted to values greater than laboratory minimum detection limit.

TABLE 14: DEER CREEK SURFACE WATER QUALITY *

DCR01 - ABOVE THE MINE

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150603	0	251	40.7	0.0	5.0	554	215.00	0.46	0.0	27.48	0.00	0.00	8.5	0.9	32.84	36	18.0	326
No. of Analysis	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
2014**																		
MIN	0	229	35.4	0	5	525	179	0	0	22.03	0	0	8.55	0.9	31.45	36	0	292
MAX	0	244	44.01	11	6	614	253	0.1	0	34.65	0	0	8.59	1.74	45.06	70	9	355
MEAN	0	236.5	39.705	5.5	5.5	569.5	216	0.05	0	28.34	0	0	8.57	1.32	38.255	53	4.5	323.5
2013**	NO SAMPLES DURING 2013																	
2012**	NO SAMPLES DURING 2012																	
2011**																		
MIN	0	249	42.93	0	5	574	243	0	0	25.43	0	0	8.33	0.85	27.21	29	0	320
MAX	0	252	63	24	5	589	262	0.18	0	32.92	0	0	8.55	0.99	38.62	50	26	325
MEAN	0	250.5	52.965	12	5	581.5	252.5	0.09	0	29.175	0	0	8.44	0.92	32.915	39.5	13	322.5
2010**	NO SAMPLES DURING 2010																	
2009**	NO SAMPLES DURING 2009																	
2008**																		
MIN	0	205	39.54	18	4	529	207	0	0	26.31	0	na	8.71	0.96	32.66	34		268
MAX	0	205	39.54	18	4	529	207	0	0	26.31	0	na	8.71	0.96	32.66	34		268
MEAN	0	205	39.54	18	4	529	207	0	0	26.31	0	na	8.71	0.96	32.66	34		268
2007**	NO SAMPLES DURING 2007																	
MIN																		
MAX																		
MEAN																		
2006**																		
MIN		238	43		6	538	223	0.06		28			8.39	1	30	35	15	279
MAX		283	49		8	720	259	0.06		33			8.59	1	47	68	15	406
MEAN		261	46		7	629	241	0.06		31			8.49	1	39	52	15	343
2005**																		
MIN		258	49	5	5	567	268	0.23		31	0		8.18	1	30	37	27	328
MAX		278	56	5	7	702	268	0.23		35	0		8.46	1	61	63	27	403
MEAN		268	53	5	6	635	268	0.23		33	0		8.32	1	45	50	27	366
2004**																		
MIN		244	43		4	505	213			26				1	33	34	11	314
MAX		244	43		4	505	213			26				1	33	34	11	314
MEAN		244	43		4	505	213			26				1	33	34	11	314
HISTORICAL 1978-2014																		
MIN	0.0	205	2.2	0.0	3.5	360	179.00	0.00	0.00	19.3	0.00	0.00	6.97	0.0	13.4	10	0	231
MAX	137.0	397	107.2	24.0	176.0	1580	599.00	40.10	0.35	83.9	0.24	5.00	8.81	4.3	111.6	255	3592	897
MEAN	9.5	299	52.8	6.2	15.8	593.67	272.35	0.76	0.07	33.6	0.04	1.01	8.06	1.2	34.0	59.19	87.76	345.07

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 15: DEER CREEK SURFACE WATER QUALITY *

DCR06 - BELOW THE MINE

2015* SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150310	0.0	292	62.3	0.0	202.0	1518	413.00	0.00	0.0	62.46	0.00	0.00	8.5	7.8	159.68	206	0	939
20150603	0.0	241	40.7	0.0	138.0	1074	281.00	0.00	0.0	43.52	0.00	0.00	8.6	3.2	106.56	101	0	602
No. of Analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014**																		
MIN	0	233	46	0	49	880	304	0	0	46	0	0	8	7	62	135	0	518
MAX	0	272	59	0	68	1048	361	1	0	54	0	0	9	8	75	181	56	587
MEAN	0	252	53	0	58	953	335	0	0	49	0	0	9	7	67	156	25	552
2013**																		
MIN	0	201	45	0	46	883	323	0	0	49	0	0	8	6	61	101	0	513
MAX	0	263	61	27	207	1320	375	0	0	54	0	0	9	8	140	191	43	727
MEAN	0	240	54	10	135	1130	346	0	0	51	0	0	8	7	107	156	15	660.5
2012**																		
MIN	0	230	48	0	33	802	318	0	0	48	0	0	8	6	48	108	0	481
MAX	0	264	58	47	117	1075	353	0	0	50	0	0	9	8	90	139	0	606
MEAN	0	247	52	17	59	904	330	0	0	49	0	0	9	7	66	126	0	520
2011**																		
MIN	0	244	51	0	30	805	323	0	0	42	0	0	8	5	48	105	0	459
MAX	0	263	63	24	104	1127	386	0	0	56	0	0	9	8	101	199	25	712
MEAN	0	255	59	6	57	913	354	0	0	50	0	0	9	6	64	145	15.5	548.25
2010**																		
MIN		251	49.1	0.0	40	894	315	0	0	44	0	0	9	8	62	151	0	555
MAX		277	58.6	33.0	103	1169	367	0	0	54	0	0	9	10	110	175	11	686
MEAN		266	54.9	10.8	62	1000	338	0	0	49	0	0	9	9	81	164	4	610
2009**																		
MIN		245	51	0	38	860	326	0	0	48	0	0	8	5	57	115	0	510
MAX		368	70	12	107	1142	413	0	0	62	0	0	9	9	91	211	22	707
MEAN		285	60	3	63	982	379	0	0	56	0	0	8	7	68	157	12	598
2008**		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
MIN		229	50	0	45	827	325	0	0	49	0	0	8	5	50	93	0	466
MAX		267	63	26	149	1279	387	0	0	56	0	0	9	7	109	151	7	744
MEAN		247	56	12	90	1027	350	0	0	51	0	0	9	6	74	123	4	588
2007**																		
MIN		243	54		30	871	332	0		46	0			5	39	74	71	431
MAX		276	66		79	988	371	1		50	0			7	64	126	71	540
MEAN		265	62		51	951	353	1		48	0			6	47	96	71	486
2006**																		
MIN		235	49		65	937	281	0		39	0			2	62	71	5	510
MAX		289	75		409	2255	406	0		57	0			6	275	113	25	1172
MEAN		267	60		179	1344	350	0		48	0			4	127	96	12	703
2005**																		
MIN		246	43		45	720	278	0		37	0			2	46	59	32	429
MAX		267	65		209	1472	375	0		51	0			6	136	109	56	791
MEAN		257	53		89	969	315	0		45	0			4	70	85	44	543
2004**																		
MIN		247	48	6	62	799	307	0			0			4	49	85	102	445
MAX		343	63	7	431	1876	351	4			0			6	254	101	216	1042
MEAN		278	54	7	196	1196	326	1			0			5	122	92	159	662
HISTORICAL 1978-2014																		
MIN	0.0	162.0	2.4	0.0	5.0	420.0	243.0	0.0	0.0	27.1	0.0	0.0	6.9	1.0	28.1	59.0	0	273
MAX	90.0	456.0	191.9	47.0	1112.0	4590.0	990.0	170.0	1.2	124.0	0.3	9.0	8.9	10.3	758.0	610.0	20540	2460
MEAN	4.4	296.2	70.0	5.9	97.9	1024.7	393.4	1.4	0.1	52.2	0.0	1.1	8.3	5.3	81.9	160.7	170.4	622.51

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 16: MEETINGHOUSE CANYON WATER QUALITY *

MHC01 - LEFT FORK

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150603	0	196.0	46.7	0.0	3	426	214.00	0.16	0.0	23.77	0.00	0.00	8.5	0.9	6.09	24	43	261
No. of Analysis	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
2014**	NO FLOW DURING 2014																	
2013**	NO FLOW DURING 2013																	
2012**	NO FLOW DURING 2012																	
2011**																		
MIN	0	207	43	0	4	487	250	0	0	24	0	0	9	1	8	33	17	266
MAX	0	225	60	0	4	502	253	1	0	35	0	0	9	1	11	42	72	281
MEAN	0	216	52	0	4	495	252	0	0	29	0	0	9	1	10	38	45	274
2010**	NO FLOW DURING 2010																	
2009**	NO FLOW DURING 2009																	
2008**																		
MIN		183	36.18		3.0	451	208	0.72		28.53			8.62	1.13	9.8	22	25	249
MAX		183	36.18		3.0	451	208	0.72		28.53			8.62	1.13	9.8	22	25	249
MEAN		183	36.18		3.0	451	208	0.72		28.53			8.62	1.13	9.8	22	25	249
2007**																		
MIN		191	37		4.0	485	221	0.33		31.60			8.39	0.90	10.0	28	31	223
MAX		191	37		4.0	485	221	0.33		31.60			8.39	0.90	10.0	28	31	223
MEAN		191	36.5		4.0	485	221	0.33		31.60			8.39	0.90	10.0	28.0	31.0	223
2006**																		
MIN		199	42		5.0	437	219	0.07		27.40			8.37	0.93	8.2	26	22	222
MAX		207	43		5.0	498	229	0.14		29.41			8.59	1.05	10.5	30	22	262
MEAN		203	43		5.0	468	224	0.11		28.41			8.48	0.99	9.4	28	22	242
2005**																		
MIN		204	41		4.0	446	237	0.40		30.80	0.006		8.41	0.94	8.9	33		261
MAX		215	51		5.0	532	255	0.56		32.80	0.012		8.56	1.21	11.6	42		301
MEAN		210	46		4.5	489	246	0.48		31.80	0.009		8.49	1.08	10.2	38		281
2004**																		
MIN		210	49		3.0	420	221	0.10		23.90	0.007		8.40	0.71	6.5	18		264
MAX		210	49		3.0	420	221	0.10		23.90	0.007		8.40	0.71	6.5	18		264
MEAN		210	49		3.0	420	221	0.10		23.90	0.007		8.40	0.71	6.5	18		264
HISTORICAL 1986-2014																		
MIN	0.0	183	2.2	0.0	1.0	300	175.00	0.02	0.0	17.20	0.00	0.00	7.0	0.0	3.8	8	0.1	183
MAX	49.0	307	80.4	34.0	47.5	557	350.00	1.20	0.3	36.50	0.10	10.90	8.8	1.6	14	100	175	304
MEAN	5.8	234	45.1	5.5	6.6	428.09	230.09	0.28	0.1	27.30	0.02	1.39	8.3	0.9	8.62	31.14	31.37	247.089

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 17: MILL FORK CANYON WATER QUALITY *

MFU3 - ABOVE MILL FORK FAULT

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150602	0.0	215	50.1	12.0	2.0	470	201.00	2.0	0.00	18.33	0.00	0.0	8.6	0.9	24.76	29	211	312
No. of Analysis	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
2014**																		
MIN	0	223	49	0	2	484	221	0	0	19	0	0	8	1	20	29	8	261
MAX	0	250	57	8	4	503	237	0	0	28	0	0	9	1	20	41	67	294
MEAN	0	237	53	4	3	494	229	0	0	24	0	0	9	1	20	35	38	278
2013**	0	245	60	0	2	535	232	10	0	20	0	0	9	1	34	44	1096	310
2012**	No Flow During 2012																	
2011**																		
MIN	0	207	63	0	5	427	235	4	0	19	0	0	8	1	6	16	1804	258
MAX	0	219	63	0	5	482	259	4	0	27	0	0	8	1	8	32	1804	259
MEAN	0	213	61	0	4	455	247	2	0	23	0	0	8	1	7	24	902	259
2010**																		
MIN	0	191	54.75	0	2	393	206.00	4	0.00	16.90	0	0.00	8.53	0.86	6	15	409	221
MAX	0	191	54.75	0	2	393	206.00	4	0.00	16.90	0	0.00	8.53	0.86	6	15	409	221
MEAN	0	191	54.75	0	2	393	206.00	4	0.00	16.90	0	0.00	8.53	0.86	6	15	409	221
2009**																		
MIN	0	209	62.60	9	2	453	251.00	0	0.00	23.11	0	0.00	8.49	0.98	6	23	0	261
MAX	0	209	62.60	9	2	453	251.00	0	0.00	23.11	0	0.00	8.49	0.98	6	23	0	261
MEAN	0	209	62.60	9	2	453	251.00	0	0.00	23.11	0	0.00	8.49	0.98	6	23	0	261
2008**																		
MIN	0.0	162	60.72	37	2	428	233	0.37	0	19.69	0.01	0	8.50	0.78	4.11	15	53	234
MAX	0.0	162	60.72	37	2	428	233	0.37	0	19.69	0.01	0	8.50	0.78	4.11	15	53	234
MEAN	0.0	162	60.72	37	2	428	233	0.37	0	19.69	0.01	0	8.50	0.78	4.11	15	53	234
2007**	No Flow During 2007																	
2006**																		
MIN		221	61.80		3	468	246	0.08		22.30			8.33	1	4.72	20	9	275
MAX		221	61.80		3	468	246	0.08		22.30			8.33	1	4.72	20	9	275
MEAN		221	61.80		3	468	246	0.08		22.30			8.33	1	4.72	20	9	275
2005**																		
MIN		187	64.20	20	2	431	240	0.22		19.40	0		8.46	1	4.35	17	50	247
MAX		187	64.20	20	2	431	240	0.22		19.40	0		8.46	1	4.35	17	50	247
MEAN		187	64.20	20	2	431	240	0.22		19.40	0		8.46	1	4.35	17	50	247
2004**																		
MIN		222	54.20		2	436	224	0.11		21.60			8.35	1	4.67	22		227
MAX		222	54.20		2	436	224	0.11		21.60			8.35	1	4.67	22		227
MEAN		222	54.20		2	436	224	0.11		21.60			8.35	1	4.67	22		227
HISTORICAL 1986-2014																		
MIN	0.0	162	49.0	0.0	2.0	393	206.0	0.00	0.00	16.90	0	0	8.22	0.71	4.11	15	0	221
MAX	0.0	251	64.2	37.0	5.0	535	259.0	9.77	0.00	27.90	0	0	8.57	1.41	34.27	44	1804	310
MEAN	0.0	216	58.9	8.1	2.6	457.92	235.4	1.53	0.00	21.50	0.0	0.00	8.43	0.96	10.23	24.75	349.6	259.917

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 18: MILL FORK CANYON WATER QUALITY *

MFA1 - ABOVE MINE

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150602.0	0	214.0	49.6	11.0	2	471	200.00	2.2	0.00	18.52	0.00	0.0	8.6	0.93	24.56	29	244	356
No. of Analysis	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
2014**	0	252	57	0	2	483	220	0	0	19	0	0	9	1	20	29	85	285
2013**	0	230	59	0	2	550	230	5	0	20	0	0	9	1	33	44	546	290
2012**	No Flow During 2012																	
2011**																		
MIN	0	206	54.73	0	2	427	231	0	0	18.49	0	0	8.42	0.73	6.17	16	0	253
MAX	0	210	61.86	0	2	468	247	13.41	0	26.71	0	0	8.5	0.99	7.4	32	1426	256
MEAN	0	208	58.295	0	2	447.5	239	6.705	0	22.6	0	0	8.46	0.86	6.785	24	713	254.5
2010**																		
MIN	0	191	54.76	0	2	387	206	3.29	0	16.82	0	0	8.56	0.85	5.89	15	379	226
MAX	0	191	54.76	0	2	387	206	3.29	0	16.82	0	0	8.56	0.85	5.89	15	379	226
MEAN	0	191	54.76	0	2	387	206	3.29	0	16.82	0	0	8.56	0.85	5.89	15	379	226
2009**																		
MIN	0.0	206	61.23	10	2	443	246.00	0	0.00	23	0	0.00	8.61	0.96	6	23	8	264
MAX	0.0	206	61.23	10	2	443	246.00	0	0.00	23	0	0.00	8.61	0.96	6	23	8	264
MEAN	0.0	206	61.23	10	2	443	246.00	0	0.00	23	0	0.00	8.61	0.96	6	23	8	264
2008**																		
MIN		162	60.59	36	2	433	233	0.40		19.78			8.52	0.78	4.20	15	26	227
MAX		162	60.59	36	2	433	233	0.40		19.78			8.52	0.78	4.20	15	26	227
MEAN		162	60.59	36	2	433	233	0.40		19.78			8.52	0.78	4.20	15	26	227
2007**																		
MIN	No Flow During 2007																	
MAX																		
MEAN																		
2006**																		
MIN		220	63		3	463	251	0.08		23			8.47	1	4.84	20	12	265
MAX		220	63		3	463	251	0.08		23			8.47	1	4.84	20	12	265
MEAN		220	63		3	463	251	0.08		23			8.47	1	4.84	20	12	265
2005**																		
MIN		190	62	17	2	429	239	0.54		21	0		8.51	1	4.51	17	43	245
MAX		190	62	17	2	429	239	0.54		21	0		8.51	1	4.51	17	43	245
MEAN		190	62	17	2	429	239	0.54		21	0		8.51	1	4.51	17	43	245
2004**																		
MIN		215	54		2	436	223			22			8.54	1	4.77	23	5	219
MAX		215	54		2	436	223			22			8.54	1	4.77	23	5	219
MEAN		215	54		2	436	223			22			8.54	1	4.77	23	5	219
HISTORICAL 1986-2014																		
MIN	0.0	153	32.0	0.0	2.0	180.0	206.00	0.00	0.0	13.00	0.00	0.00	8.0	0.7	1	12	0	176
MAX	0.0	400	82.0	36.0	24.0	813.0	462.00	13.41	0.5	73.00	0.00	0.00	8.6	3.0	33.27	223	1426	710
MEAN	0.0	263	57.6	7.5	8.2	506.0	286.58	1.33	0.1	34.68	0.00	0.00	8.3	1.5	10.50	56.0322581	120.862	323.161

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 19: MILL FORK CANYON WATER QUALITY *

MFB2 - BELOW MINE

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150602	0.0	232	49.4	6.0	2.0	493	211.00	3.56	0.0	21.20	0.00	0.00	8.6	1.1	22.85	37	95	656
No. of Analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014**																		
MIN	0	240	52	0	2	496	240	0	0	22	0	0	8	1	17	36	0	276
MAX	0	278	60	0	7	695	342	0	0	52	0	0	9	2	19	105	117	428
MEAN	0	259	56	0	5	596	291	0	0	37	0	0	9	2	18	71	59	352
2013**	NO FLOW DURING 2013																	
2012**	NO FLOW DURING 2012																	
2011**																		
MIN	0	217	63	0	2	441	239	18	0	20	0	0	8	1	6	19	1872	266
MAX	0	217	63	0	2	441	239	18	0	20	0	0	8	1	6	19	1872	266
MEAN	0	217	63	0	2	441	239	18	0	20	0	0	8	1	6	19	1872	266
2010**																		
MIN		203	55	0	2	414	219	0	0	20	0	0	9	1	7	22	0	258
MAX		272	64	22	9	732	399	4	0	58	0	0	9	3	15	104	416	432
MEAN		238	60	11	6	573	309	2	0	39	0	0	9	2	11	63	208	345
2009**																		
MIN		267	59	0	6	628	347	0	0	43	0	0	9	2	12	70	0	357
MAX		269	67	0	10	759	408	0	0	63	0	0	9	3	15	117	18	473
MEAN		268	63	0	8	694	378	0	0	53	0	0	9	2	13	94	9	415
2008**																		
MIN		283	67	0	10	810	441			66	0		8	3	16	132	0	504
MAX		293	75	18	11	918	474			70	0		9	3	17	148	0	546
MEAN		288	71	9	11	864	458			68	0		8	3	17	140	0	525
2007**																		
MIN		315	70		11	956	438			64	0.003		8.13	2.32	17.40	124	7	561
MAX		351	82		14	1040	519			77	0.003		8.33	3.60	20.40	177	7	579
MEAN		336	77		12	984	487			71	0.003		8.23	2.94	19.23	154	7	571
2006**																		
MIN		251	66		5	564	296	0		32	0.002		8.41	1.29	7.06	39	17	324
MAX		332	77		12	924	447	0		62	0.002		8.43	2.58	16.98	132	17	497
MEAN		292	71		9	744	372	0		47	0.002		8.42	1.94	12.02	86	17	411
2005**																		
MIN		200	56	16	3	461	258	1		23	0.018		8.46	0.97	5.12	22	54	280
MAX		274	66	22	9	730	350	1		51	0.018		8.48	2.33	12.90	77	54	415
MEAN		237	61	19	6	596	304	1		37	0.018		8.47	1.65	9.01	50	54	348
2004**																		
MIN		279	58	10	10	654	327	0		44	0.027		8.49	1.88	10.60	67		338
MAX		297	59	10	12	684	357	0		51	0.027		8.52	2.52	13.90	93		415
MEAN		288	59	10	11	669	342	0		47	0.027		8.51	2.20	12.25	80		377
HISTORICAL 1986-2014																		
MIN	0	183	1	0	2	240	219	0	0	14	0	0	7.27	0.7	5	16	0	204
MAX	0	412	81.6	37	17	1040	519	17.68	10	81.06	0.005	0	8.9	5.2	20.4	177	1872	579
MEAN	0.0	299	58.8	9.7	8.5	592	330.90	0.99	1.0	45.33	0.00	0.00	8.3	2.0	11.32	70.25	84.81	372.354

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 20: RILDA CANYON SURFACE WATER QUALITY *

RCF1 - RILDA CANYON FLUME - RIGHT FORK

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150602	0.0	215	52.5	0.0	1.0	418.0	216.00	1.07	0.0	20.69	0.00	0.00	8.6	0.6	4.6	11	117	264
20150914	0.0	196	45.8	0.0	2.0	425	211.00	0.00	0.0	23.61	0.00	0.00	8.4	1.6	8.83	22	0	251
No. of Analysis	2	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	2
2014**																		
MIN	0	209	49	0	2	432	208	0	0	18	0	0	8	1	5	11	0	232
MAX	0	226	53	0	2	433	216	0	0	23	0	0	9	1	9	22	52	255
MEAN	0	218	51	0	2	433	212	0	0	21	0	0	9	1	7	17	26	244
2013**																		
MIN	0	198	50	0	1	406	201	0	0	19	0	0	8	1	6	12	48	186
MAX	0	198	53	0	2	421	212	8	0	19	0	0	9	1	9	17	744	233
MEAN	0	198	51	0	2	414	207	4	0	19	0	0	9	1	8	15	396	209.5
2012**																		
MIN	0	209	56	0	1	438	226	0	0	21	0	0	8	1	7	18	12	229
MAX	0	213	56	0	2	447	242	0	0	25	0	0	9	1	9	25	26	256
MEAN	0	211	56	0	2	443	234	0	0	23	0	0	8	1	8	22	19	243
2011**																		
MIN	0	196	53	0	1	408	222	0	0	18	0	0	9	1	4	10	17	226
MAX	0	209	60	0	1	431	224	4	0	22	0	0	9	1	8	22	347	231
MEAN	0	203	56	0	1	420	223	2	0	20	0	0	9	1	6	16	182	228.5
2010**																		
MIN		201	58	0	1	399	218	1	0	18	0	0	9	1	5	10	133	226
MAX		201	58	0	1	399	218	1	0	18	0	0	9	1	5	10	133	226
MEAN		201	58	0	1	399	218	1	0	18	0	0	9	1	5	10	133	226
2009**																		
MIN		202	53	9	3	446	237	0	0	25	0	0	9	1	9	25	0	264
MAX		202	53	9	3	446	237	0	0	25	0	0	9	1	9	25	0	264
MEAN		202	53	9	3	446	237	0	0	25	0	0	9	1	9	25	0	264
2008**																		
MIN		198	52	0	2	446	228	0		0	0		0	1	1	9		0
MAX		202	53	9	3	453	228	237		24	25		9	9	9	24		252
MEAN		200	53	5	3	450	228	119		12	13		4	5	5	16		126
2007**																		
MIN		186	51		2	484	217	0.05		21.6	0.000		8.05	0.74	7.36	19		242
MAX		199	53		3	513	240	0.05		26.0	0.000		8.32	1.24	8.93	27		263
MEAN		193	52.4		2.5	498.5	228.5	0.05		23.8	0.000		8.19	0.99	8.15	23.0		252.5
2006**																		
MIN		207	56		3	434	228	0.25		19.7	0		8.46	0.86	5.00	15	16	240
MAX		213	59		3	488	231	0.25		22.1	0		8.49	1.01	8.06	23	16	259
MEAN		210	58		3	461	230	0.25		20.9	0		8.48	0.94	6.53	19	16	250
2005**																		
MIN		199	56		2	420	236	0.31		19.1	0		8.30	0.80	4.86	13	73	268
MAX		208	65		3	485	240	0.31		23.5	0		8.61	1.14	8.74	22	73	280
MEAN		204	60		3	453	238	0.31		21.3	0		8.46	0.97	6.80	18	73	274
2004**																		
MIN		195	46		2	394	193	0.06		18.7	0		8.44	0.77	5.36	16	6	145
MAX		204	51		3	433	220	0.06		22.9	0		8.60	1.02	8.02	25	6	233
MEAN		200	48		3	414	207	0.06		20.8	0		8.52	0.90	6.69	21	6	189
HISTORICAL 1989-2014																		
MIN	0	177	46	0	1	300	193	0	0	17.54	0	0	7.78	0.01	3.78	1	0	145
MAX	10	329	108.6	27	15	513	384	8.04	1.2	30	0.14	5	8.88	10	24	80	744	292
MEAN	1.8	230	57.5	6.8	3.8	428.25	233.43	0.74	0.1	21.88	0.03	1.26	8.5	1.3	7.65	20.63	76.516	245.95

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 21: RILDA CANYON SURFACE WATER QUALITY *

RCF3 - RILDA CANYON FLUME - ABOVE NEWUA SPRINGS

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150310	0.0	350	85.0	0.0	10.0	883.0		427.0	0.6	0.0	52.1	0.0	0.0	8.1	2.8	24.3	157.0	103.0	583.0
20150602	0.0	218.0	51.6	0.0	2.0	419.0		218.0	2.5	0.0	21.7	0.0	0.0	8.6	0.6	5.1	14.0	221.0	277.0
20150914	0.0	313.0	87.1	0.0	9.0	880.0		454.0	0.1	0.0	57.5	0.0	0.0	8.1	2.8	24.3	144.0	0.0	580.0
20151204	0.0	337.0	87.2	0.0	10.0	895.0	9.8	452.0	0.0	0.0	56.9	0.0	0.0	8.2	2.8	24.2	152.0	8.0	582.0
No. of Analysis	4	4	4	4	4	4	1	4	4	4	4	4	4	4	4	4	4	4	4
2014**																			
MIN	0	339	85	0	9	871	0	425	0	0	52	0	0	8	3	25	139	0	550
MAX	6	343	89	0	10	920	0	447	0	0	54	0	0	8	4	55	170	0	586
MEAN	3	341	87	0	10	896	0	436	0	0	53	0	0	8	3	40	155	0	568
2013**																			
MIN	0	205	53	0	1	155	0	221	0	0	20	0	0	8	1	7	17	0	214
MAX	5	339	97	11	10	901	0	486	12	0	59	0	0	9	3	25	154	1092	562
MEAN	3	274	76	3	6	599	0	351	3	0	39	0	0	8	2	16	88	284	386
2012**																			
MIN	0	250	67	0	4	576	8	297	0	0	32	0	0	8	1	12	56	0	334
MAX	30	350	101	0	10	921	8	495	0	0	59	0	0	8	3	26	159	8	556
MEAN	8	312	85	0	8	782	8	413	0	0	48	0	0	8	2	20	113	4	468
2011**																			
MIN	0	212	59.9	0	2.0	423	8.70	228	0.16	0.00	19.14	0.00	0.00	7.95	0.80	4.79	13.0	0.0	258
MAX	5	351	97.0	0	11.0	899	8.70	481	14.79	0.00	58.07	0.03	0.00	8.54	2.82	24.63	152.0	1786.0	573
MEAN	1	287	79.9	0	7.0	702	8.70	373	3.86	0.00	42.22	0.02	0.00	8.19	1.97	16.74	95.0	448.0	436
2010**																			
MIN					2.0	411	6.10	221	0.29		18.45	0.00		7.87	0.81	5.10	13.0	0.0	233
MAX					11.0	922	10.20	510	1.37		62.65	0.04		8.56	3.10	26.36	157.0	100.0	592
MEAN					7.3	765	8.80	419.75	0.65		48.58	0.02		8.14	2.42	19.78	111.3	34.0	488
2009**																			
MIN	0	217	62		2	462	8	251	0		23	0		8	1	7	26	6	288
MAX	15	374	108		10	1005	9	545	1		67	0		8	3	30	183	90	678
MEAN	9	330	91		8	840	8	448	1		53	0		8	3	22	130	31	550
2008**																			
MIN	0	179	61		2	470	9	242	1		22	0		8	1	5	18	8	247
MAX	20	378	115		10	1072	16	577	1		70	0		9	4	29	213	12	742
MEAN	10	322	97		8	911	12	471	1		55	0		8	3	23	147	10	571
2007**																			
MIN		285	77.6		6.0	834	10.09	378	0.20		44.70	0.02		7.54	1.86	15.60	90.0	5.0	438
MAX		400	132.0		12.0	1304	12.48	614	1.17		69.10	0.09		8.04	3.51	30.06	255.0	6.0	746
MEAN		370	111.2		10.2	1128.2	11.26	536.2	0.50		62.75	0.05		7.79	3.14	26.11	196.0	5.5	653
2006**																			
MIN		220	62		3.0	487	10.3	252	0.16		23.8	0		7.78	0.98	6.4	25	6	278
MAX		376	112		12.0	1073	12.5	563	0.30		69.0	0		8.18	3.32	26.8	185	18	626
MEAN		328	94		8.8	906	11.7	454	0.25		53.3	0		7.97	2.57	20.9	135	10	517
2005**																			
MIN		206	61	13.0	2.0	437	9.1	239	0.15		21.2	0		7.94	0.94	5.8	19	109	273
MAX		353	95	13.0	11.0	974	14.2	467	2.16		56.0	0		8.53	3.16	27.4	155	109	586
MEAN		310	83	13.0	7.8	805	11.6	392	0.68		44.8	0		8.13	2.32	19.9	111	109	486
2004**																			
MIN	8	217	53		3.0	450	6.0	225	0.17		22.6	0		7.92	0.94	7.1	29	19	217
MAX	15	448	102		12.0	948	13.3	505	0.27		60.7	0		8.31	2.82	27.3	176	19	613
MEAN	12	341	85		8.0	791	10.1	408	0.21		47.5	0		8.08	2.29	20.8	128	19	478
HISTORICAL 1989-2014						0.2	0.5												
MIN	0.0	179	50.4	0.0	1.0	155.0	4.4	204	0.02	0.00	18.5	0.00	0.0	7.50	0.01	4.8	7.0	0.0	199
MAX	38.0	500	132.0	30.0	50.0	1304.0	15.5	748	14.79	0.41	70.2	0.20	5.0	8.83	5.00	55.0	255.0	1786.0	746
MEAN	7.4	348	84.9	3.6	8.8	747.2	8.6	404.4	0.71	0.06	45.4	0.04	1.3	8.10	2.26	17.8	106.5	69.3	461

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 22: RILDA CANYON SURFACE WATER QUALITY *

RCW4 - RILDA CANYON FLUME - NEAR HIGHWAY 31

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150310	0	359	116	0	36	1448		771	0	0	117	0	0	8	5	35	463	0	1100
20150602	0	222	59	20	6	534		275	3	0	31	0	0	8	1	8	52	441	339
20150914	0	312	113	0	23	1359		720	0	0	106	0	0	8	5	36	416	0	999
20151204	0	350	120	0	31	1382	11	760	0	0	112	0	0	8	5	45	203	0	1054
No. of Analysis	4	4	4	4	4	4	1	4	4	4	4	4	4	4	4	4	4	4	4
2014**																			
MIN	0	244	60	0	5	533	0	257	0	0	26	0	0	8	1	8	44	0	301
MAX	0	360	136	8	36	1526	0	859	0	0	126	0	0	9	5	36	508	124	1126
MEAN	0	315	107	2	27	1198	#DIV/0!	639	0	0	90	0	0	8	4	28	350	31	855
2013**																			
MIN	0	245	70	0	7	647	0	326	0	0	37	0	0	8	2	12	96	0	347
MAX	0	349	131	0	36	1433	0	816	9	0	120	0	0	8	5	35	459	101	1055
MEAN	0	306	108	0	24	1162	0	634	2	0	88	0	0	8	4	28	333	36	804
2012**																			
MIN	0	301	102	0	17	1143	0	615	0	0	88	0	0	8	4	26	327	0	763
MAX	20	356	141	26	29	1512	0	865	0	0	125	0	0	8	5	34	485	6	1112
MEAN	5	328	120	7	24	1329		738	0	0	106	0	0	8	5	31	393	2	949
2011**																			
MIN	0	215	60.8	0	3.0	457	9.20	239	0.00	0.00	21.31	0.00	0.00	8.37	0.92	5.81	26.0	0.0	266
MAX	0	362	142.2	0	32.0	1498	9.20	882	18.51	0.00	128.02	0.00	0.00	8.49	5.16	34.54	517.0	2084.0	1145
MEAN	0	295	105.5	0	18.8	1078	9.20	605	4.64	0.00	83.12	0.00	0.00	8.42	3.48	23.75	304.3	523.5	776
2010**																			
MIN		224	65.3		3.0	528	6.70	277	0.00		27.78	0.00		8.29	1.24	7.57	58.0	0.0	315
MAX		367	140.5		19.0	1551	10.50	925	1.29		139.37	0.00		8.50	5.03	33.43	552.0	102.0	1233
MEAN		322	115.7		14.5	1220	9.15	707	0.39		101.48	0.00		8.36	3.98	25.67	383.8	28.0	915
2009**																			
MIN		243	77.1		5.0	679	8.40	367	0.00		42.44	0.00		8.15	1.69	11.59	118.0	0.0	450
MAX		361	161.5		17.0	1683	9.20	1015	0.36		148.57	0.00		8.46	5.51	35.14	643.0	21.0	1393
MEAN		320	125.3		13.5	1331	8.80	778	0.09		112.93	0.00		8.32	4.23	27.27	444.0	5.3	1048
2008**																			
MIN		222	72		3	601	9	313	0		32	0		8	1	8	72	0	336
MAX		356	175		20	1890	14	1137	1		170	0		9	6	38	764	92	1532
MEAN		307	139		13	1447	11	852	0		122	0		8	5	28	503	23	1095
2007**																			
MIN		296	115.0		12.0	1392	10.12	678	0.07		94.80	0.00		7.98	2.99	24.10	349.0	5.0	868
MAX		373	172.0		25.0	2050	13.47	1060	0.07		155.00	0.00		8.37	5.25	37.10	698.0	5.0	1429
MEAN		339	153.4		18.8	1810.2	11.35	947.2	0.07		136.95	0.00		8.15	4.51	33.70	606.4	5.0	1292.6
2006**																			
MIN		242	70.2		5.0	592	10.41	313	0.35		33.40	0.00		8.20	1.45	9.65	61.0	26.0	351
MAX		337	114.0		16.0	1272	13.50	659	0.35		90.80	0.00		8.41	3.78	28.40	309.0	26.0	825
MEAN		305	96.1		12.0	1038	11.96	529	0.35		70.00	0.00		8.31	2.95	21.57	222.3	26.0	663.3
2005**																			
MIN		222	65.5		3.0	421	9.38	270	2.96		25.90	0.06		8.28	1.02	7.44	35.0	188.0	302
MAX		339	99.7		15.0	1129	15.87	550	2.96		73.00	0.06		8.55	3.13	27.50	239.0	188.0	729
MEAN		298	83.2		11.0	846	12.25	442	2.96		56.80	0.06		8.38	2.40	20.48	164.7	188.0	564.7
2004**																			
MIN	10	252	60.9		5.0	585	4.46	297	0.65		35.10	0.02	3.0	8.27	1.53	11.80	75.0	35.0	348
MAX	10	421	90.0		16.0	979	10.57	529	0.65		73.90	0.02	3.0	8.45	3.19	27.20	210.0	35.0	666
MEAN	10	325	74.3		10.3	796	8.19	415	0.65		55.77	0.02	3.0	8.33	2.45	20.47	147.3	35.0	511
HISTORICAL 1989-2014																			
MIN	0.0	209	59.0	0.0	2.0	400	3.9	239	0.00	0.00	21.31	0.000	0.0	7.27	0.01	5.81	15.0	0.0	260
MAX	40.0	461	175.1	51.0	700.0	2050	15.9	1137	18.51	0.28	170.07	0.20	5.0	8.86	10.00	52.00	764.0	2084.0	1532
MEAN	4.6	350	94.2	4.8	23.5	965	8.7	530.1	0.86	0.04	71.60	0.03	1.2	8.31	3.18	23.03	229.8	72.8	659.3

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 23: COTTONWOOD CANYON CREEK WATER QUALITY *

SW-1

Note: SW-1 Was transferred to Bowie Resource Partner, LLC in June 2015

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150317	17	372	93	0	18	977	486	0	0	62	0	0	8	1	29	167	8	637
20150604	8	401	96	0	20	1024	522	0	0	69	0	0	8	1	35	173	0	660
No. of Analysis	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2014**	0	400	94	0	17	1018	506	0	0	66	0	0	8	2	32	199	0	654
2013**	NO FLOW DURING 2013																	
2012**																		
MIN	0	383	90	0	17	911	486	0	0	63	0	0	8	2	31	143	0	577
MAX	6	389	93	0	18	1016	515	0	0	69	0	0	8	2	32	160	11	621
MEAN	3	386	92	0	18	964	501	0	0	66	0	0	8	2	31	152	6	599
2011**																		
MIN	0	245	68	0	5	534	296	0	0	31	0	0	8	1	9	31	0	303
MAX	5	355	86	13	13	841	459	1	0	59	0	0	9	2	25	110	62	512
MEAN	2	294	74	4	9	677	370	0	0	45	0	0	8	1	17	70	23	399
2010**																		
MIN	1	1	1	0	1	1	1	0	0	1	0	0	1	1	1	1	1	1
MAX	17	384	98	1	20	1036	519	1	1	67	1	1	8	2	34	187	14	664
MEAN	9	193	49	1	11	519	260	1	1	34	1	1	4	1	18	94	8	333
2009**																		
MIN	12	358	95	0	20	992	527	0	0	70	0	0	8	2	35	169	6	663
MAX	14	400	100	0	22	1109	580	0	0	80	0	0	8	2	37	216	29	706
MEAN	13	379	97	0	21	1051	554	0	0	75	0	0	8	2	36	193	18	685
2008**																		
MIN		400	100		20	1109	0	580		0	80		0	8	2	37	216	29
MAX		400	100		20	1109	0	580		0	80		0	8	2	37	216	29
MEAN		400	100		20	1109		580		0	80		0	8	2	37	216	29
2007**																		
MIN		355	85		16	924	457	0		60	0		8	2	27	131	35	560
MAX		389	88		20	1026	513	0		71	0		8	2	34	149	35	630
MEAN		372	86		18	975	485	0		66	0		8	2	30	140	35	595
2006**																		
MIN		245	60		6	583	284	0		32	0		8	1	10	35	7	318
MAX		335	81		13	858	425	0		54	0		8	1	22	96	28	452
MEAN		302	72		10	755	369	0		46	0		8	1	17	71	14	405
2005**																		
MIN		237	60		5	535	281	0		31	0		8	1	11	37	9	336
MAX		372	83		14	968	456	0		60	0		8	2	25	125	17	565
MEAN		305	72		10	752	369	0		46	0		8	1	18	81	13	451
2004**																		
MIN		331	86		14	858	443			56			8	2	23	165	5	575
MAX		331	86		14	858	443			56			8	2	23	165	5	575
MEAN		331	86		14	858	443			56			8	2	23	165	5	575
HISTORICAL 1977-2014																		
MIN	0.0	231	6.0	0.0	0.7	380	210.00	0.00	0.0	2	0.0	0.00	7.1	1.0	6.0	20.0	0	226
MAX	27.0	442	152.3	20.0	27.0	1109	580.0	15.90	0.4	80	1.3	358.00	8.7	21.0	60.0	238.7	1298	706
MEAN	5.8	339	69.0	4.3	12.8	722	360.3	0.76	0.1	42	0.1	9.11	8.0	2.7	20.9	81.8	60	402.8

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 24: COTTONWOOD CANYON CREEK WATER QUALITY *

SW-2

Note: SW-2 Was transferred to Bowie Resource Partner, LLC in June 2015

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150317	0	322	85	0	27	1065	511	0	0	73	0	0	8	5	41	211	0	682
20150604	0	332	71	0	26	1010	457	0	0	68	0	0	8	5	40	199	0	658
No. of Analysis	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2014**																		
MIN	0	286	74	0	14	955	442	0	0	62	0	0	8	4	35	177	0	601
MAX	0	330	82	0	22	1042	468	0	0	64	0	0	9	6	36	217	17	642
MEAN	0	310	78	0	17	993	456	0	0	64	0	0	9	5	36	201	9	622
2013**																		
MIN	0	285	73	0	14	964	439	0	0	62	0	0	8	6	36	214	0	569
MAX	5	329	91	0	20	1042	520	0	0	71	0	0	8	7	40	223	41	670
MEAN	2	308	83	0	17	1001	482	0	0	67	0	0	8	6	38	217	14	631
2012**																		
MIN	0	301	81	0	13	934	478	0	0	64	0	0	8	4	34	159	0	549
MAX	0	346	89	19	19	1010	505	1	0	68	0	0	9	7	38	228	63	648
MEAN	0	323	86	5	16	979	490	0	0	67	0	0	8	6	36	199	19	608
2011**																		
MIN	0	323	80	0	16	934	478	0	0	64	0	0	8	4	34	157	0	549
MAX	0	346	88	29	30	984	484	1	0	69	0	0	9	5	36	194	63	634
MEAN	0	334	83	16	22	965	481	0	0	67	0	0	8	4	35	170	23	601.6667
2010**																		
MIN	0	302	84	0	14	985	480	0	0	64	0	0	8	6	35	230	0	674
MAX	0	335	94	28	25	1062	559	0	0	79	0	0	8	7	42	258	29	736
MEAN	0	321	89	11	19	1029	510	0	0	70	0	0	8	6	40	239	7	700
2009**																		
MIN	0	293	79	0	15	1001	490	0	0	69	0	0	8	5	36	220	0	630
MAX	9	340	101	5	22	1099	577	0	0	79	0	0	8	7	44	242	12	782
MEAN	2	318	88	1	18	1032	519	0	0	73	0	0	8	6	39	231	7	690
2008**																		
MIN	0	288	70	0	15	915	462	0		70	0		8	4	33	178	0	526
MAX	0	360	96	0	26	1162	549	0		75	0		8	7	43	244	10	718
MEAN	0	315	85	0	19	1034	507	0		71	0		8	6	37	218	3	652
2007**																		
MIN	8	287	78	5	14	995	464	0		65	0		8	4	34	170	16	597
MAX	8	326	92	26	22	1156	515	0		71	0		8	7	41	257	16	716
MEAN	8	305	87	16	17	1068	500	0		68	0		8	6	37	231	16	680
2006**																		
MIN		244	57		8	597	289	0		35	0		8	1	12	45	5	331
MAX		327	86		23	1057	503	0		70	0		8	4	34	183	35	628
MEAN		298	75		17	905	432	0		59	0		8	3	28	138	20	520
2005**																		
MIN		233	58	9	7	558	282	0		34	0		8	1	12	46	5	333
MAX		331	92	9	42	1283	546	0		77	0		9	6	46	250	38	768
MEAN		303	75	9	22	971	446	0		63	0		8	4	32	174	18	593
2004**																		
MIN		287	73	8	16	908	448	1		60	0		8	4	33	214	10	602
MAX		345	87	8	45	1097	510	1		71	0		8	7	49	289	49	692
MEAN		310	81	8	28	1001	472	1		66	0		8	6	41	243	30	659
HISTORICAL 1977-2014																		
MIN	0.00	233	11.1	0.0	1.5	410	113.00	0.000	0.0	2.40	0.00	0	7.0	1.0	8	19.5	0	267
MAX	25.00	642	136.9	85.0	179.0	1709	631.00	16.20	1.3	109.00	1.37	39	9.4	25.6	268	289	1004	1170
MEAN	3.56	346	69.86	8.79	22.01	941	404.73	0.85	0.08	50.69	0.06	2.2	8.2	4.8	45	141	58.52	526.98

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 25: COTTONWOOD CANYON CREEK WATER QUALITY *

SW-3

Note: SW-3 Was transferred to Bowie Resource Partner, LLC in June 2015

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20150604	7	428	102	0	209	1919	619	0	0	88	0	0	8	5	178	349	20	1227
No. of Analysis	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2014**	NO FLOW DURING 2014																	
2013**	NO FLOW DURING 2013																	
2012**																		
MIN	0	385	101	0	220	1945	667	0	0	94	0	0	8	4	196	337	0	1226
MAX	7	432	112	0	225	2047	669	0	0	101	0	0	8	5	206	363	11	1246
MEAN	4	409	107	0	223	1996	668	0	0	98	0	0	8	5	201	350	6	1236
2011**																		
MIN	0	253	61	0	6	543	285	0	0	32	0	0	8	1	10	38	9	291
MAX	0	394	109	48	241	2022	681	1	0	99	0	0	9	4	200	365	144	1314
MEAN	0	308	80	16	110	1219	478	1	0	67	0	0	8	3	94	197	68	758.33
2010**	NO FLOW DURING 2010																	
2009**	NO FLOW DURING 2009																	
2008**																		
MIN	1	1	1		1	1	1	0.08		1	0.016		1.00	1.00	1	1	0	1
MAX	10	466	124		303	2300	784	1.00		115	1.000		8.21	4.46	220	395	1	1498
MEAN	7	311	83		202	1534	523	0.39		77	0.344		5.81	3.31	147	264	0	999
2007**																		
MIN	6	352	110		330	2380	748	0		115	0		8	5	220	382	9	1515
MAX	6	375	117		336	2390	778	0		118	0		8	6	228	401	9	1544
MEAN	6	364	113		333	2385	763	0		117	0		8	5	224	392	9	1530
2006**																		
MIN		246	58		33	738	312	0		41	0		8	2	27	69	37	409
MAX		346	105		215	1914	668	0		99	0		8	4	140	279	37	1120
MEAN		296	81		124	1326	490	0		70	0		8	3	83	174	37	765
2005**																		
MIN		228	57	10	10	566	301	0		39	0		9	1	15	51	14	332
MAX		433	153	10	447	3070	913	0		129	0		9	5	221	444	23	1835
MEAN		331	105	10	229	1818	607	0		84	0		9	3	118	248	19	1084
2004**	NO FLOW DURING 2004																	
HISTORICAL 1977-2014																		
MIN	0.0	228	14.3	0.0	1.7	506	99.00	0.04	0.000	2.4	0.00	0.00	7	1	3.0	22	0	40
MAX	27.0	633	159.0	70.0	607.0	3070	913.00	19.00	0.43	129.0	2.48	114.00	9	30	531.0	444	5024	1835
MEAN	5.0	370	72.7	12.2	61.8	1317	434.46	1.03	0.11	52.6	0.12	4.33	8.16	4	86.7	174.69	126.94	652.42

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 26: GRIMES WASH WATER QUALITY *

GWR01 - RIGHT FORK

2015 **SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
	NO SAMPLES COLLECTED DURING 2015 - NO FLOW																	
No. of Analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014**	NO SAMPLES COLLECTED DURING 2014 -NO FLOW																	
2013**	NO SAMPLES COLLECTED DURING 2013 -NO FLOW																	
2012**	NO SAMPLES COLLECTED DURING 2012 -NO FLOW																	
2011**	NO SAMPLES COLLECTED DURING 2011 -NO FLOW																	
2010**	NO SAMPLES COLLECTED DURING 2010 -NO FLOW																	
2009**	NO SAMPLES COLLECTED DURING 2009 -NO FLOW																	
2008**	NO SAMPLES COLLECTED DURING 2008 -NO FLOW																	
2007**	NO SAMPLES COLLECTED DURING 2007 -NO FLOW																	
2006**	NO SAMPLES COLLECTED DURING 2006 -NO FLOW																	
2005**	NO SAMPLES COLLECTED DURING 2005 -NO FLOW																	
2004**	NO SAMPLES COLLECTED DURING 2004 -NO FLOW																	
HISTORICAL 1979-2014																		
MIN	0.1	104	30.0	1.0	3.0	190	112	0.01	0.05	6.30	0.01	0.5	7.20	1.60	1.85	20.0	0.5	115
MAX	39.0	320	57.0	1.0	26.4	750	320	20.60	3.31	46.20	0.30	9.0	8.70	7.64	20.44	161.7	7116.0	700
MEAN	5.5	238	42.6	1.0	10.8	557	238	1.38	0.47	31.96	0.06	1.8	8.09	3.21	13.20	63.7	370.2	338

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 27: GRIMES WASH WATER QUALITY *

GWR02 - LEFT FORK

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
	NO SAMPLES COLLECTED DURING 2015 - NO FLOW																	
No. of Analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014**	NO SAMPLES COLLECTED DURING 2014 -NO FLOW																	
2013**	NO SAMPLES COLLECTED DURING 2013 -NO FLOW																	
2012**	NO SAMPLES COLLECTED DURING 2012 -NO FLOW																	
2011**																		
MIN	0	267	50	0	9	709	327	0	0	49	0	0	8	1	42	111	0	416
MAX	0	323	84	0	12	882	443	1	0	57	0	0	9	2	42	160	67	564
MEAN	0	295	67	0	11	796	385	1	0	53	0	0	8	1	42	136	34	490
2010**	NO SAMPLES COLLECTED DURING 2010 -NO FLOW																	
2009**	NO SAMPLES COLLECTED DURING 2009 -NO FLOW																	
2008**	NO SAMPLES COLLECTED DURING 2008 -NO FLOW																	
2007**																		
MIN		297	56.2		11	810	359			53			8.3	1.1	40	129		527
MAX		297	56.2		11	810	359			53			8.3	1.1	40	129		527
MEAN		297	56.2		11	810	359			53			8.3	1.1	40	129		527
2006**																		
MIN		263	51	16	9	732	305	1		43	0		8.4	1.2	34	82	9	391
MAX		303	71	16	9	838	369	1		47	0		8.5	1.4	39	112	25	497
MEAN		283	61	16	9	785	337	1		45	0		8.4	1.3	37	97	17	444
2005**																		
MIN		286	55	9	9	803	330	0		47	0		8.5	1.4	38	101	5	450
MAX		304	69	25	9	818	380	0		50	0		8.6	1.8	40	117	53	491
MEAN		295	62	17	9	811	355	0		49	0		8.5	1.6	39	109	29	471
2004**	NO SAMPLES COLLECTED DURING 2004 -NO FLOW																	
HISTORICAL 1979-2014																		
MIN	1.0	188	2.3	1.0	6.0	410	196	0.02	0.02	23.80	0.01	0.1	7.30	1.00	11.10	30.4	0.5	212
MAX	34.0	482	88.9	26.0	156.0	917	460	2.52	0.22	68.50	0.15	3.5	8.85	3.00	42.00	212.0	1428.0	570
MEAN	4.2	312	51.5	6.4	14.6	652	308	0.22	0.08	42.54	0.03	1.0	8.08	1.50	31.30	91.4	51.8	380

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

TABLE 28: GRIMES WASH WATER QUALITY *

GWR03 - RIGHT FORK

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
	NO SAMPLES COLLECTED DURING 2015 - NO FLOW																	
No. of Analysis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014**	NO SAMPLES COLLECTED DURING 2014 -NO FLOW																	
2013**	NO SAMPLES COLLECTED DURING 2013 -NO FLOW																	
2012**																		
MIN	5	190	76	0	104	973	364	2	0	42	0	0	8	8	63	187	110	599
MAX	5	190	76	0	104	973	364	2	0	42	0	0	8	8	63	187	110	599
MEAN	5	190	76	0	104	973	364	2	0	42	0	0	8	8	63	187	110	599
2011**																		
MIN	0	265	57	0	58	941	384	0	0	59	0	0	8	2	65	146	9	566
MAX	0	292	86	0	70	1126	499	0	0	69	0	0	8	2	69	214	22	726
MEAN	0	279	72	0	64	1034	442	0	0	64	0	0	8	2	67	180	16	646
2010**	NO SAMPLES COLLECTED DURING 2010 -NO FLOW																	
2009**																		
MIN	7	293	144	0	475	2810	931	0	0	139	0	0	8	8	262	578	0	1863
MAX	7	293	144	0	475	2810	931	0	0	139	0	0	8	8	262	578	0	1863
MEAN	7	293	144	0	475	2810	931	0	0	139	0	0	8	8	262	578	0	1863
2008**																		
MIN		335	158		397	2740	1004	0.17		148.2	0.007		8.18	8.06	236	561	22	1873
MAX		335	158		397	2740	1004	0.17		148.2	0.007		8.18	8.06	236	561	22	1873
MEAN		335	158		397	2740	1004	0.17		148.2	0.007		8.18	8.06	236	561	22	1873
2007**																		
MIN		275	80		204	1689	564	0.08		88	0.00		8.11	4.08	143	300	6	1082
MAX		340	157		517	3210	1049	0.09		161	0.01		8.50	8.66	294	622	6	2071
MEAN		311	131		397	2653	863	0.09		130	0.01		8.28	6.78	231	486	6	1685
2006**																		
MIN		277	64	15	29	900	363	0.07		48	0.00		8.40	1.66	45	122	10	512
MAX		282	66	15	73	1081	388	0.50		56	0.00		8.47	2.14	70	142	16	619
MEAN		280	65	15	51	991	376	0.29		52	0.00		8.44	1.90	57	132	13	565.5
2005**																		
MIN		257	70	7	35	856	373	0.07		48	0.00		8.34	2.09	48	134	11	581
MAX		308	145	16	360	2760	799	0.74		106	0.02		8.50	5.77	215	427	56	1620
MEAN		282	97	12	165	1622	537	0.50		71	0.01		8.44	3.57	116	244	34	974.3
2004**																		
MIN		311	122		183	1657	674	0.09	1.18	90	0.00		7.68	5.74	118	434	7	1159
MAX		394	192		539	3020	1048	2.62	1.18	144	0.04		8.21	7.73	252	653	134	2006
MEAN		349	167		433	2629	945	0.94	1.18	129	0.02		8.04	7.19	213	582	49	1758
HISTORICAL 1979-2014																		
MIN	0.0	117	5.1	0.0	10.0	0.8	0.48	0.00	0.000	10.7	0.00	0.00	7.10	0.0	9.0	46	0	152
MAX	127.0	486	274.0	16.0	4531.0	0.2	0.48	22.60	2.26	160.8	0.90	27.00	8.81	12.8	3181.0	783	9702	7160
MEAN	11.5	340	125.2	2.5	294.1	0.3	0.63	0.77	0.18	83.5	0.06	2.70	8.08	5.8	202.5	356.3	156.3202	1088.7

* Quality parameters are reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater then laboratory minimum detection limit.

Table 29

EAST MOUNTAIN SPRINGS DISCHARGE

MILL FORK

2015

Spring	Date Sampled	Flow (GPM)	Temp. C	Date Sampled	Flow (GPM)	Temp. C	Seasonal Net Change %
EM-216	7/8/2015	8.4	10.7	10/13/2015	seep	0.0	
EMPOND	7/8/2015	5.9	6.1	10/14/2015	1.0	8.6	-82.65
GRANTS SPRING	7/8/2015	2.1	5.0	10/14/2015	0.8	6.7	-63.41
LITTLE BEAR	7/14/2015	285.0	9.2	10/15/2015	305.0	8.3	7.02
JV-9	7/6/2015	0.8	9.3	10/13/2015	seep	0.0	
JV-34	7/6/2015	1.6	17.0	10/13/2015	1.4	12.9	-14.56
MF-7	7/22/2015	18.2	4.4	10/22/2015	12.8	404.0	-29.67
MF-10	7/13/2015	8.6	3.7	10/14/2015	2.2	3.2	-74.42
MF-19B	7/13/2015	0.8	8.1	10/14/2015	0.4	6.1	-53.16
MF-213	7/22/2015	33.4	10.2	10/22/2015	15.5	6.5	-53.59
MF-219	7/6/2015	4.8	8.1	10/26/2015	0.1	4.3	-98.14
MFR-10	7/6/2015	17.7	9.8	10/26/2015	2.1	5.6	-88.10
MFR-30	7/6/2015	1.1	6.2	10/26/2015	seep	0.0	
RR-5	7/13/2015	9.0	4.4	10/26/2015	seep	0.0	
RR-15	7/23/2015	18.3	3.9	10/27/2015	9.8	4.4	-46.45
RR-23A	7/23/2015	9.8	4.5	10/27/2015	7.2	5.5	-26.53
SPI-26	7/13/2015	23.1	4.4	10/14/2015	4.5	5.2	-80.52
SPI-29	7/13/2015	SEEP	0.0	10/14/2015	seep	0.0	
UJV-101	7/6/2015	1.3	8.0	10/13/2015	0.7	7.3	-46.56
UJV-206	7/6/2015	2.8	7.6	10/14/2015	1.8	5.6	-36.00
UJV-213	7/6/2015	0.0	0.0	10/13/2015	0.0	0.0	
TOTAL FLOW FOR JULY		**452.6**			**365.1**		

Table 30: East Mountain Yearly Spring Discharge Variations (GPM)

SOUTHERN AREA JULY FLOW DATA**

Spring	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sheba	22.9	19.7	14.4	8.6	11.4	10.4	1.1	8.1	10.1	6.3	11.0	0.9	10.6	14.9	4.8	7.2	6.1	2.6	2.9	0.4	3.0	3.1	6.5	5.0	1.3	1.3	2.6	3.9	9	0.67	0.04	2.75	8.61

**Note: Hydrologic Program Reduction approved December 2014. See previous annual reports for past spring flow data.

MILL FORK AREA JULY FLOW DATA

Spring	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
EM-216												0.3	0					0	0.5	0	Seep	Dry	Dry	1.8	0.0	Damp	Damp	Damp	1.3	Seep	seep	0.35	0.8
EMPOND											3	6	0.5					0.8	2.3	1.3	3.3	3.5	6.7	4.3	2.3	4.0	4.0	1.3	9.6	1.6	2.93	3.3	5.9
GRANTS SPRING																				0.4	1.32	1.6	2.3	2.3	1.0	1.8	1.3	1.5	2.8	0.8	1.26	1.8	2.1
LITTLE BEAR*	430	409	357	383	388	340	332	270	296	243	419	218	418	443	447	477	428	395	373	240	284	385.0	350.0	396.0	349.0	378.0	366.0	297.0	380.4	345.6	345.6	318	285.0
JV-9																		1.5	1.8	0.8	1.6	1.4	1.7	2.2	1.2	1.6	3.0	1.3	2.0	0.1	0.24	0.39	0.8
JV-34																		3.6	47.2	0	4.3	9.5	37.0	80.0	8.6	42.8	17.3	9.3	48.0	Seep	Dry	2.68	1.6
MF-7											20	10						9.2	30	13.3	21.1	23.7	42.0	30.0	19.4	34.7	33.3	33.3	63.8	24.0	26.09	20.2	18.2
MF-10											0.5	0.25	10					6.8	27.3	14.3	60	35.3	40.0	54.0	19.2	46.2	33.4	18.8	54.5	9.8	7.06	8.36	8.6
MF-19B												0.25	0.5					0.4	0	1.3	1.3	1.9	2.3	1.4	0.5	1.9	1.2	1.2	2.4	Seep	seep	0.96	0.8
MF-213																		17.6	26.1	20.1	27	33.0	68.0	55.0	29.3	58.30	46.2	46.2	66.7	27.3	27.52	35.3	33.4
MF-219																		2.1	5.6	2.4	2.7	3.1	5.0	2.3	4.0	2.0	5.3	10.5	13.0	0.2	0.7	3.7	4.84
MFR-10																			151	4.9	11.81	11.6	12.9	19.4	10.4	29.1	11.3	23.1	42.9	10.3	11.58	12.3	17.65
MFR-30																			26.6	0	0.75	1.0	1.2	2.3	0.1	2.3	1.2	1.6	2.9	0.0	seep	Seep	1.13
RR-5												2	0					0	1.6	1.1	8.66	8.7	15.0	13.8	3.0	15.4	4.0	9.0	33.8	Seep	4.48	8.34	9
RR-15												20	10					8	13.9	12	24	26.0	10.6	37.0	17.1	32.4	21.1	39.2	54.2	16.7	19.4	26.1	18.3
RR-23A													5					10	15	11	26.6	42.0	34.0	32.0	30.0	8.7	31.6	49.6	42.8	19.4	25.7	20.3	9.8
SPI-26																		4.4	4.3	5.8	18.6	14.0	26.7	23.5	9.0	28.6	2.8	16.2	54.5	6.2	18.18	18.8	23.1
SPI-29																			0.5	0.4	1.6	1.7	1.0	0.8	0.3	1.0	0.7	0.9	2.8	Seep	0.58	0.77	SEEP
UJV-101											0	0	0.3					0.8	3.9	0	1.1	1.5	1.6	0.8	0.7	1.3	1.3	1.7	2.4	0.8	0.55	1.53	1.31
UJV-206											0	0.5	0					2.1	2.6	1.5	1.1	2.4	6.0	7.9	3.2	3.40	2.5	1.6	3.5	0.8	1.5	3.44	2.75
Totals											442.5	257.3	444.3					462.3	733.2	330.6	500.8	606.9	664.0	766.8	508.4	693.5	587.5	563.3	883.0	463.6	493.37	486.62	445.0

Table 31a

Mode of Occurrence – East Mountain Springs – Southern Area

Occurrences

Stratigraphic Location	Permeable fluvial channels that intersect the land surface	Flow along permeable strata underlain by impermeable mudstone which intersects he land surface	Contact of permeable beds and the Roans Canyon Fault zone	Mode of Occurrence not identified
Base of Flagstaff		79-6, 79-7, 79-35, 86-58, 89-69	Sheba Springs, 79-1	
North Horn Formation	Ted's Tub, Burnt Tree, 79-2, 79-3, 79-8, 79-9, 79-11, 79-12, 79-13, 79-14, 79-15, 79-16, 79-17, 79-21, 79-22, 79-26, 79-27, 79-28, 79-29, 79-34, 79-39, 80-42, 80-43, 80-46, 80-47, 80-48, 80-53, 84-56, 86-59, 89-62, 89-63, 89-64, 89-65, 89-66, 89-67, 89-68, 89-71		Elk Springs, 79-10, 79-18, 79-19, 79-20, 84-54, 89-61, 89-70	
Base of North Horn Formation		79-23, 79-25, 79-32, 79-36, 79-37, 79-38, 84-55	79-30, 79-31	
Other Stratigraphic Horizons	Blackhawk Formation 80-50, 84-57, 91-73 Price River Formation Bear Canyon Fault Zone 82-51		Price River 80-49, Blackhawk 91-72	Flagstaff Limestone 79-4, 79-5, Pine Springs Trough Price River Formation 79-24, 79-33, 79-40, 80-41, 80-44, 80-45, 82-52, Jerk Water, 89-60 (Alpine)

Table 31b

Mode of Occurrence – East Mountain Springs – Mill Fork Area

Occurrences

Stratigraphic Location	Flow along permeable strata (fluvial channels) underlain by impermeable mudstone which intersects he land surface
Alluvium **Joes Valley Alluvium** **JV-1 through JV-35**	
Flagstaff Limestone	EM-221A
North Horn Formation	EM-216, EM-217, EM-218, EM-221B, EM-222,EM-223, EM-227, EM-228, EMPOND, GRANTS SPRING, JV-36, JV-37, JV-38, JV-39, JV-40, JV-41, JV-42, JV-43, JV-44, JV-45, JV-46, JV-47, JV-48, JV-49, JV-50, JV-51, JV-52, MF-10, MF-11, MF-12, MF-13, MF-14, MF-14A, MF-15, MF-16, MF 18, MF-18A, MF-18B, MF-18C, MF-19A, MF-19B, MF-19E, MF-19H, MF-19I, MF-21, MF-217, MF-218, MF-219, MF-220, MF-221, MFR-1, MFR-2, MFR-3, MFR-7, MFR-8, MFR-9, MFR-10, MFR-11, MFR-16, MFR-17, MFR-18, MFR-19, MFR-20, MFR-21, MFR-22, MFR-23, MFR-24, RR-2, RR-2A, RR-2B, RR-3, RR-4, RR-4A, RR-5, RR-6, RR-6A, RR-7A, RR-10, RR-11, RR-12, RR-14, RR-14A, RR-14B, RR-15, RR-16, RR-17, RR-18, RR-20, RR-21, RR-22, RR-23, RR-23A, RR-24, RR-24A, RR-25, RR-26, RR-27, RR-28, RR-30, RR-34, SP1-26, SP1-29, SP1-31, SP2-42, UJV-100, UJV-100A, UJV-104, UJV-105, UJV-202, UJV-203
Upper Price River Formation	EM-214, EM-215, MF-1, MF-4, MF-4A, MF-5, MF-20, MFR-4, MFR-5, MFR-12, MFR-13, MFR-14, MFR-15, MFR-26, MFR-27, MFR-28, MFR-29, MFR-30, MFR-31, MFR-32, RR-7, UJV-100C, UJV-105B, UJV-106, UJV-106A, UJV-109, UJV-109B, UJV-109 South, UJV-151, UJV-204, UJV-205, UJV-206, UJV-207, UJV-209, UJV-209A
Castle Gate Sandstone	MFR-6, UJV-101, UJV-208, UJV-210, UJV-211, UJV-212, UJV-213
Blackhawk Formation	MF-2, MF-3, MF-7, MF-8A, MF-213, MFR-2
Star Point Sandstone	Little Bear Spring

TABLE 32: TEMPERATURE COMPARISON

	EAST MOUNTAIN	*ELECTRIC LAKE*	*CASTLE DALE*	*HUNTINGTON PLANT*
	DEPARTURE FROM	*DEPARTURE FROM*	*DEPARTURE FROM*	*DEPARTURE FROM*
1993				
JAN	-3.8	2.7	0.9	-0.8
FEB	-3.5	-2.9	0.5	-4.3
MAR	4.2	-3.6	7.2	-0.5
APR	-2.2	0.1	4.4	-2.0
MAY	4.1	2.8	8.9	1.6
JUN	-3.9	-2.2	5.8	-4.1
1994				
JAN	0.8	2.3	-1.2	6.3
FEB	-3.5	3.2	1.6	-3.5
MAR	6.1	6.6	10.1	5.0
APR	0.0	6.0	4.7	0.2
MAY	4.6	7.2	8.9	2.7
JUN	9.1	4.8	13.4	5.4
1995				
JAN	1.4	1.6	3.9	1.5
FEB	10.3	5.2	11.8	7.4
MAR	3.1	2.4	7.6	0.1
APR	3.4	-0.1	3.4	-2.0
MAY	2.2	-3.9	3.4	-5.5
JUN	1.1	-2.2	2.5	-6.6
1996				
JAN	5.1	2.1	3.5	2.4
FEB	7.7	-0.9	8.4	1.6
MAR	7.5	0.6	7.8	1.5
APR	3.0	2.6	5.4	1.1
MAY	8.5	3.6	8.0	2.2
JUN	8.5	5.2	9.6	1.2
1997				
JAN	-0.9	1.6	0.1	0.3
FEB	0.8	-5.7	-2.3	-4.2
MAR	8.8	6.2	8.1	2.2
APR	1.4	-0.7	3.2	-3.1
MAY	0.0	4.2	10.5	3.5
JUN	4.6	4.9	8.9	-0.6
1998				
JAN	4.2	2.0	6.9	5.4
FEB	-1.5	-3.1	4.6	-2.8
MAR	6.4	2.1	5.7	1.0
APR	0.6	-2.0	0.8	-2.9
MAY	5.0	0.3	5.3	-0.5
JUN	-2.3	-1.1	3.0	-6.1
1999				
JAN	7.8	5.4	8.9	8.0
FEB	4.7	-0.5	7.6	2.1
MAR	7.4	4.1	8.6	6.7
APR	-0.9	-3.7	-1.8	-1.9
MAY	-0.4	-1.0	4.9	-0.1
13-14	0.4	0.8	0.2	0.3
JUN	3.2	1.6	5.6	0.6
2000				
JAN	2.5	3.6	10.0	4.0
FEB	4.4	-0.9	9.8	5.0
MAR	1.8	1.0	6.8	2.0
APR	8.6	7.2	7.0	6.0
MAY	9.2	7.4	11.0	5.9
JUN	5.8	3.3	8.8	2.8

TABLE 32: TEMPERATURE COMPARISON

	EAST MOUNTAIN	*ELECTRIC LAKE*	*CASTLE DALE*	*HUNTINGTON PLANT*
	DEPARTURE FROM	*DEPARTURE FROM*	*DEPARTURE FROM*	*DEPARTURE FROM*
2001				
JAN	-9.2	-2.6	1.3	1.0
FEB	-11.5	-2.0	1.0	-4.0
MAR	-7.8	4.4	9.0	1.9
APR	-8.5	3.0	2.2	-1.1
MAY	-3.9	6.5	9.5	
JUN	-6.0	3.7	9.0	
2002				
JAN	-4.7	-4.0	1.9	
FEB	-6.4	-8.1	2.0	
MAR	-1.0	-1.8	2.2	
APR	3.5	5.6	7.4	
MAY		3.0	7.8	
JUN	6.0	4.4	10.5	
2003				
JAN	12.6	1.9	10.1	
FEB	-1.8	-4.3	4.0	
MAR	3.4	1.7	6.2	
APR	3.1	0.3	3.9	
MAY	10.0	3.0	10.2	
JUN	2.7	1.9	8.0	
2004				
JAN	1.0	-3.8	-5.3	
FEB	-2.5	-6.4	0.4	
MAR	9.1	9.0	10.5	
APR	0.5	6.6	6.7	
MAY	5.7	3.0	8.1	
JUN	1.7	2.0	7.5	
2005				
JAN	14.1	8.9	6.1	
FEB	6.3	-6.1	4.4	
MAR	7.2	-0.3	10.8	
APR	7.1	-2.0	2.6	
MAY	8.8	-0.1	8.7	
JUN	3.7	-3.5	0.2	
2006				
JAN	5.6	-7.2	2.3	3.9
FEB	2.3	-14.1	2.2	0.0
MAR	2.3	-3.4	0.3	-4.1
APR	7.3	3.0	6.5	2.6
MAY	11.2	6.0	12.1	3.7
JUN	4.3	5.2	9.8	2.2
2007				
JAN	8.0	9.4	1.1	1.3
FEB	6.9	-0.1	7.1	5.9
MAR	14.4	6.6	4.8	11.2
APR	5.6	5.3	2.4	2.8
MAY	7.1	3.3	1.7	2.0
JUN	9.9	4.2	2.6	4.4

TABLE 32: TEMPERATURE COMPARISON

	EAST MOUNTAIN	*ELECTRIC LAKE*	*CASTLE DALE*	*HUNTINGTON PLANT*
	DEPARTURE FROM	*DEPARTURE FROM*	*DEPARTURE FROM*	*DEPARTURE FROM*
2008				
JAN	5.1	NA	-2.9	-3.1
FEB	-6.6	NA	-2.6	-2.0
MAR	5.8	NA	-0.9	-2.5
APR	-3.4	NA	-1.7	-3.0
MAY	-5.1	NA	-1.4	-3.6
JUN	-4.2	-1.1	0.3	-0.5
2009				
JAN	9.6	NA	3.5	-3.1
FEB	3.4	NA	6.2	-0.6
MAR	-6.5	NA	2.3	0.9
APR	-3.4	NA	1.5	-1.2
MAY	6.8	NA	3.2	3.4
JUN	-2.7	NA	-0.4	-5.1
2010				
JAN	2.6	NA	-3.2	-6.3
FEB	2.0	NA	-6.2	-1.4
MAR	5.1	NA	-1.0	0.5
APR	6.5	NA	2.1	-0.4
MAY	2.6	NA	-1.9	2.1
JUN	8.9	NA	3.5	-2.2
2011				
JAN	0.1	NA	3.1	-0.7
FEB	-4.3	NA	1.8	-3.5
MAR	8.5	NA	1.0	-0.8
APR	4.3	NA	-1.8	-2.7
MAY	-0.2	NA	-4.4	-7.0
JUN	-2.7	NA	-1.6	1.0
2012				
JAN	2.5	NA	7.0	2.0
FEB	-4.0	NA	4.4	0.1
MAR	5.7	NA	5.2	2.6
APR	7.3	NA	4.1	2.9
MAY	3.7	NA	3.2	3.1
JUN	6.2	NA	4.9	4.0
2013				
JAN	0.4	NA	-8.8	-5.0
FEB	-2.2	NA	-1.4	-0.4
MAR	-5.8	NA	1.2	1.1
APR	-7.4	NA	-1.7	-0.6
MAY	2.4	NA	0.9	2.7
JUN	-10.6	NA	3.6	4.0
2014				
JAN	4.2	NA	5.5	3.6
FEB	5.7	NA	5.0	6.4
MAR	-2.0	NA	1.1	0.5
APR	-7.8	NA	0.4	0.4
MAY	11.5	NA	0.7	3.5
JUN	-4.9	NA	0.2	-0.7
2015				
JAN	6.2	NA	8.4	3.7
FEB	1.3	NA	8.4	6.1
MAR	12.8	NA	5.3	4.5
APR	1.9	NA	-0.5	1.0
MAY	-3.4	NA	-1.8	-2.2
JUN	5.6	NA	4.9	1.1

TABLE 32: TEMPERATURE COMPARISON

	EAST MOUNTAIN	*ELECTRIC LAKE*	*CASTLE DALE*	*HUNTINGTON PLANT*
	DEPARTURE FROM	*DEPARTURE FROM*	*DEPARTURE FROM*	*DEPARTURE FROM*

TABLE 32: TEMPERATURE COMPARISON

YEAR	*EAST MOUNTAIN*	*ELECTRIC LAKE*	*HUNTER PLANT*	*HUNTINGTON PLANT*	*TOTAL*
1982		-2.8	0.0	1.2	-0.5
1983		-2.7	2.5	1.0	0.3
1984		-2.2	0.5	0.1	-0.5
1985	3.1	0.3	3.0	0.9	1.8
1986	2.9	3.4	6.3	3.2	4.0
1987	1.7	-0.5	3.2	1.1	1.4
1988	-0.2	-0.1	3.5	0.5	0.9
1989	0.0	-0.1	4.1	0.3	1.1
1990	2.3	1.8	7.3	1.2	3.2
1991	-1.9	-1.4	3.8	-2.5	-0.5
1992	1.9	6.5	6.6	1.8	4.2
1993	-0.9	-0.5	4.6	-1.7	0.4
1994	2.9	5.0	6.3	2.7	4.2
1995	3.6	0.5	5.4	-0.9	2.2
1996	6.7	2.2	7.1	1.7	4.4
1997	2.5	1.8	4.8	-0.3	2.2
1998	2.1	-0.3	4.4	-1.0	1.3
1999	3.4	0.8	5.8	2.0	3.0
2000	5.4	3.6	8.9	4.3	5.6
2001	-7.8	2.2	5.3		-0.1
2002	-0.5	-0.2	5.3		1.5
2003	5.0	0.8	7.1		4.3
2004	2.6	1.7	4.7		3.0
2005	7.9	-0.5	5.5		4.3
2006	5.5	-1.8	5.5	1.4	2.7
			CASTLE DALE		
2007	8.6	4.8	3.3	4.6	5.3
2008	-1.4		-1.5	-2.5	-1.8
2009	1.2	NA	2.7	-0.9	0.99
2010	4.6	NA	-1.1	-1.3	0.73
2011	0.9	NA	-0.3	-2.3	-0.55
2012	3.6	NA	4.8	2.4	3.60
2013	-3.9	NA	-1.0	0.3	-1.54
2014	1.1	NA	2.1	2.3	1.84
2015	4.1	NA	4.1	2.4	3.50

Table 33

The springs in Table 33 have been removed from the hydrologic monitoring program

Table 34a: East Mountain Springs Water Quality (Historical vs. 2015) *

Southern Area

PARAMETER	Burnt Tree Historical	Burnt Tree 2015	Elk Spring Historical	Elk Spring 2015	Sheba Springs Historical	Sheba Springs 2015	79-10 Historical	79-10 2015	79-23 Historical	79-23 2015	79-26 Historical	79-26 2015
Elevation	9260		9350		9740		9350		9035		9310	
Geologic Formation	TKn		TKn		Tf		Kpr		TKn		TKn	
Bicarbonate	Removed from monitoring program		Removed from monitoring program		283.87	254.00	Removed from monitoring program		Removed from monitoring program		Removed from monitoring program	
Calcium					84.17	84.29						
Carbonate					1.00	0.00						
Chloride					4.24	1.00						
Cond.(umhos/cm)					454.00	501.00						
Hardness					250.55	259.50						
Iron					0.10	0.00						
Magnesium					10.75	11.87						
Mangenese					0.04	0.00						
pH(units)					7.52	7.41						
Potassium					1.64	0.00						
Sodium					3.94	3.36						
Sulfate					13.98	4.5						
TDS					263.22	301						

PARAMETER	79-29 Historical	79-29 2015	79-35 Historical	79-35 2015	80-44 Historical	80-44 2015	80-46 Historical	80-46 2015	82-52 Historical	82-52 2015	84-56 Historical	84-56 2015
Elevation	9410		9585		8980		9350		8995		9335	
Geologic Formation	TKn		Tf		Kpr		TKn		Kpr		TKn	
Bicarbonate	Removed from monitoring program		Removed from monitoring program		Removed from monitoring program		Removed from monitoring program		Removed from monitoring program		Removed from monitoring program	
Calcium												
Carbonate												
Chloride												
Cond.(umhos/cm)												
Hardness												
Iron												
Magnesium												
Mangenese												
pH(units)												
Potassium												
Sodium												
Sulfate												
TDS												

* Quality parameters reported as mg/l unless otherwise noted

Table 34b: East Mountain Springs Water Quality (Historical vs. 2015) *

Mill Fork Area

PARAMETER	EM POND Historical	EM POND 2015	EMS JV34 Historical	EMS JV34 2015	EMS JV9 Historical	EMS JV9 2015	EMS MF 7 Historical	EMS MF 7 2015	EMS MF10 Historical	EMS MF10 2015	EMS MF19B Historical	EMS MF19B 2015
Elevation	9260		9350		9740		9350		9035		9310	
Geologic Formation	TKn		TKn		Tf		Kpr		TKn		TKn	
Bicarbonate	240.32	226.5	315.57	303	330.00	309.00	273.14	264.50	206.93	197	231.71	228
Calcium	58.93	58.52	83.91	85.0	87.41	82.78	71.65	76.77	54.07	49.3	65.85	63.7
Carbonate	0.00	0	0.00	0	0.00	0	0.00	0	0.36	0	2.18	0
Chloride	1.40	0.5	3.10	2	4.75	4	2.64	3	1.39	0.5	2.00	1
Cond.(umhos/cm)	456.79	453	598.78	618.5	679.30	661	583.83	610	408.64	406	452.81	448.5
Hardness	238.89	239.5	312.39	320	356.93	349	298.00	311	213.89	207	243.10	235
Iron - Total	0.24	0.08	0.45	0.15	0.01	0.27	0.12	0	0.00	0	0.41	0.12
Magnesium	22.30	22.62	25.00	26.16	34.57	34.54	28.92	30.84	19.14	20.37	19.10	18.41
Manganese - Total	0.00	0	0.01	0.02	0.01	0	0.00	0	0.00	0	0.02	0
pH (units)	7.96	7.83	8.10	8	7.39	7.35	7.86	7.72	8.14	8.23	8.29	8.3
Potassium	0.64	0.59	1.30	0.95	1.36	1.26	1.20	1.43	0.86	0.84	0.10	0.53
Sodium	2.17	2.41	7.60	7.6	7.33	7.46	9.03	11.99	2.17	2.32	1.82	3.21
Sulfate	4.49	3	18.57	24.5	51.14	44	47.06	56	7.06	7.5	6.52	5.5
TDS	246.36	240	332.30	361.5	384.93	346	330.03	367.5	225.75	223	249.00	266

PARAMETER	EMS MF213 Historical	EMS MF213 2015	EMS MF219 Historical	EMS MF219 2015	EMS MFR-10 Historical	EMS MFR-10 2015	EMS MFR-30 Historical	EMS MFR-30 2015	EMS RR-15 Historical	EMS RR-15 2015	EMS RR-23A Historical	EMS RR-23A 2015
Elevation	8,030		10,220		9,900		9,680		10,350		10,023	
Geologic Formation	Kbh		TKn		TKn		Kpr		TKn		TKn	
Bicarbonate	271.28	249.5	234.78	227	262.64	236	305.17	316.0	230.25	214	252.61	244
Calcium	65.04	61.76	64.83	65.77	72.54	68.21	84.28	84	58.40	57.35	69.38	69.76
Carbonate	0.60	0	0.00	0	0.40	0	0.00	0.0	0.00	0	0.00	0
Chloride	2.57	2.5	1.95	2	2.36	2	2.25	3	1.04	1	1.63	1
Cond.(umhos/cm)	541.66	525.5	491.04	515	526.04	512.5	624.83	633	437.21	439	493.75	495
Hardness	281.28	268.5	259.00	283.5	278.36	275	311.00	318.0	228.68	228.5	257.32	259
Iron - Total	0.10	0	0.17	0	0.17	0	0.42	0.0	0.08	0	0.25	0
Magnesium	28.87	27.87	23.57	29	23.62	25.42	24.43	26.2	20.12	20.68	20.41	20.62
Manganese - Total	0.00	0	0.00	0.002	0.00	0	0.01	0.0	0.00	0	0.00	0
pH (units)	8.02	8.07	7.91	8	8.08	8.18	7.95	7.9	7.88	7.88	7.60	7.57
Potassium	1.03	1.165	1.30	1.8	0.81	0.75	0.81	1.4	0.72	1.02	0.67	0.81
Sodium	5.77	7.83	2.41	2.64	4.04	4.55	12.96	13.2	2.94	4.67	2.79	3.25
Sulfate	25.81	39	27.62	41	23.35	25.5	32.25	34.0	6.52	7	12.00	12.5
TDS	294.66	304	273.48	299.5	294.86	287.5	351.08	338	241.96	243.5	274.96	287.5

PARAMETER	EMS RR-5 Historical	EMS RR-5 2015	EMS SP1-26 Historical	EMS SP1-26 2015	EMS SP1-29 Historical	EMS SP1-29 2015	EMS UJV101 Historical	EMS UJV101 2015	EMS UJV206 Historical	EMS UJV206 2015	GRANTS SPRING Historical	GRANTS SPRING 2015	LITTLE BEAR Historical	LITTLE BEAR 2015
Elevation	10,160		10,340		10,360		8,960		9,200		10,280		7,540	
Geologic Formation	TKn		TKn		TKn		Kcg		Kpr		TKn		Ksp	
Bicarbonate	210.88	211	208.86	213	270.63		236.08	228.5	248.71	227	230.88	216	283.61	270.5
Calcium	62.78	58.03	59.73	64.04	69.05		70.46	70.39	67.46	62.77	54.24	49.13	66.08	61.46
Carbonate	0	0	0	0	0	No	0	0	0	0	0	0	0.00	0
Chloride	1.30	0	2.50	2.33	2.16	Flow in	4.35	3.5	4.73	4.5	3.52	2.5	3.96	3.5
Cond.(umhos/cm)	425.95	420	421.21	459.67	502.84	2015	530.00	542	525.21	522.5	463.80	450	592.30	574
Hardness	224.85	213	213.55	236.33	266.32		272.88	281	265.43	253.5	241.08	227.5	314.35	294.5
Iron - Total	0.31	0	0.25	0.04	0.01		0.23	0.06	0.02	0	0.00	0	0.02	0
Magnesium	16.54	16.53	15.65	18.56	22.77		23.51	25.63	23.54	23.45	25.65	25.54	36.25	34.23
Manganese - Total	0.00	0	0.00	0	0.00		0.00	0	0.00	0	0.00	0	0.00	0
pH (units)	7.90	7.63	7.90	7.89	7.64		8.05	8.17	7.95	7.84	7.77	7.73	7.42	7.39
Potassium	0.54	0.45	0.74	0.95	1.35		1.27	1.37	1.59	1.64	1.45	1.26	1.64	1.45
Sodium	1.82	1.79	2.23	3.61	3.32		5.78	6.24	6.36	6.42	3.53	3.4	7.39	8.38
Sulfate	8.60	7	6.84	23	6.70		41.69	58	32.46	35.5	11.20	9	37.44	41.5
TDS	239.85	248	232.66	265	270.00		305.54	324	292.29	289	248.20	237	324.26	340

* Quality parameters reported as mg/l unless otherwise noted

TABLE 35: NEWUA - RILDA CANYON SPRING FLOW (GPM)
MONTHLY MEASUREMENTS

TABLE 35: NEWUA - RILDA CANYON SPRING FLOW (GPM)
MONTHLY MEASUREMENTS

DATE	*METER 2*	*METER 3*	*METER 4*	*TOTAL*
1/27/2004				
2/27/2004				
3/15/2004	0.4	35.2	36	*****
4/26/2004	0.5	100	101	45
5/25/2004	0.4	136	136	120
6/29/2004	*****	120	120	*****
7/26/2004	*****	130	130	*****
8/6/2004	*****	125	125	100
9/9/2004	*****	142	142	100
10/12/2004	*****	30	30	96
11/30/2004	*****	*****	*****	83
12/14/2004	*****	*****	*****	73
1/13/2005	*****	*****	68	68
2/16/2005	*****	*****	65	65
3/11/2005	*****	*****	62	62
4/29/2005	*****	*****	85	85
5/10/2005	*****	*****	100	100
6/9/2005	*****	*****	230	230
7/6/2005	*****	*****	240	240
8/25/2005	*****	*****	233	233
9/22/2005	*****	*****	*****	*****
10/24/2005	*****	115	150	150
11/30/2005	*****	112	158	158
1/5/2006	*****	63	72	72
1/20/2006	*****	*Inaccessible*	72	72
2/23/2006	*****	*Inaccessible*	72	72
3/14/2006	*****	*Inaccessible*	83	83
4/25/2006	*****	100	102	102
5/23/2006	*****	200	160	160
6/20/2006	*****	200	230	230
7/26/2006	*****	230	240	240
8/9/2006	*****	210	235	235
9/27/2006	*****	150	*****	*****
6/2006	*****	103	150	150
7/2006	*****	100	158	158
12/7/2006	*****	107	125	125
1/10/2007	*****	*100*	140	140
2/20/2007	*****	*94*	130	130
3/26/2007	*****	*60*	125	125
4/17/2007	*****	70	115	115
5/10/2007	*****	95	250	250
6/29/2007	*****	190	270	270
7/17/2007	*****	170	++++	
8/20/2007	*****	162	++++	
9/20/2007	*****	127	++++	
10/26/2007	*****	60	150	150
11/14/2007	*****	60	115	115
12/5/2007	*****	50.8	95	95
1/15/2008	*****	*Inaccessible*	65	65
2/20/2008	*****	*Inaccessible*	65	65
3/24/2008	*****	*Inaccessible*	65	65
4/23/2008	*****	100	75	75
5/28/2008	*****	10	210	210
6/17/2008	*****	11	240	240
7/7/2008	*****	10	260	260
8/18/2008	*****	10	250	250
9/22/2008	*****	107	230	230
10/22/2008	*****	54	160	160
11/18/2008	*****	44	130	130
12/4/2008	*****	42	80	80
1/13/2009	*****	*Inaccessible*	75	75
2/17/2009	*****	*Inaccessible*	61	61
3/24/2009	*****	37	61	61
4/16/2009	*****	27	65	65
5/7/2009	*****	44	65	65
6/18/2009	*****	183	235	235
7/14/2009	*****	150	240	240
8/20/2009	*****	167	240	240
9/9/2009	*****	130	125	125
10/26/2009	*****	50	110	110
11/6/2009	*****	33	100	100
/2009	*****	*****	120	120
/2/2010	*****	*****	90	90
2/17/2010	*****	*****	80	80
3/17/2010	*****	*****	80	80
4/20/2010	*****	*****	85	85

TABLE 35: NEWUA - RILDA CANYON SPRING FLOW (GPM)
MONTHLY MEASUREMENTS

DATE	METER 2	METER 3	METER 4	TOTAL
5/20/2010	*****	*****	150	150
6/8/2010	*****	*****	210	210
7/9/2010	*****	180	210	210
8/12/2010	*****	190	420	420
9/9/2010	*****	130	300	300
10/27/2010	*****	26	210	210
11/12/2010	*****	43	165	165
12/7/2010	*****	40	160	160
1/12/2011	*****	Inaccessible	148	148
2/7/2011	*****	Inaccessible	150	150
3/22/2011	*****	Inaccessible	150	150
4/11/2011	*****	56	160	160
5/26/2011	*****	188	355	355
6/15/2011	*****	200	200	200
7/22/2011	*****	167	253	253
8/22/2011	*****	214	250	250
9/6/2011	*****	200	235	235
10/18/2011	*****	160	225	225
11/9/2011	*****	81	150	150
12/5/2011	*****	68	210	210
1/10/2012	*****	48	97	97
2/7/2012	*****	40	95	95
3/13/2012	*****	38	97	97
4/10/2012	*****	43	0	0
5/10/2012	*****	200	0	0
6/12/2012	*****	130	170	170
7/3/2012	*****	30	210.6	210.6
8/15/2012	*****	87	180.6	180.6
9/10/2012	*****	Line Const.	161	161
10/22/2012	*****	Line Const.	0	0
11/6/2012	*****	Line Const.	0	0
12/4/2012	*****	Line Const.	0	0
1/9/2013	Removed	Line Const.	80	80
2/13/2013		65	80	80
3/12/2013		40	80	80
[illegible]/19/2013		40	100	100
[illegible]/2013		40	120	120
[illegible]/2013		129.8	130	130
7/24/2013		150	140	140
8/13/2013		117	140	140
9/5/2013		93	140	140
10/23/2013		120	100	100
11/7/2013		120	98	98
12/3/2013		102	98	98
1/16/2014		102	76.5	76.5
2/17/2014		74	76.5	76.5
3/17/2014		76	78.1	78.1
4/21/2014		84	102.5	102.5
5/14/2014		84	116.8	116.8
6/4/2014		175	143.2	143.2
7/3/2014		193	146.9	146.9
8/20/2014		166	147.5	147.5
9/2/2014		118	141	141
10/9/2014		85	89.2	89.2
11/6/2014		79	91.2	91.2
12/9/2014		50	84	84
1/9/2015		45.4	75.2	75.2
2/12/2015		45.4	83.2	83.2
3/10/2015		41.5	75.2	75.2
4/14/2015		37.7	105.6	105.6
5/13/2015		166.8	114.6	114.6
6/2/2015		202	143.3	143.3
7/9/2015		195	15303	15303
8/11/2015		166.8	167.9	167.9
9/14/2015		110.5	151.6	151.6
10/15/2015		79.2	103.7	103.7
11/9/2015		71.5	86.7	86.7
12/4/2015		59.3	75.9	75.9

* Flow not stabilized.
** Data collected during pump test.
*** Diverted through Meter 3.
**** Over capacity
* [illegible]eter/Valve problems
+[illegible] - Valve would not seat
++ Canyon Accessible
+++ Main Meter Not Working - Used Total of Meter 2 & 3
++++ Line Replacement

TABLE 36

NEWUA - RILDA CANYON SPRINGS
AVERAGE WATER QUALITY*

PARAMETER **	METER 2		METER 3		METER 4
	Historical	2015	Historical	2015	Historical
					Combined with Meter 3 in 1995
Bicarbonate	433.17	Removed	359.89	288.50	356.38
Calcium	88.41		76.95	65.29	70.3
Carbonate	1.96		0.90	0.00	0.7
Chloride	10.48		8.86	6.25	13.1
Cond.(umhos/cm)	792.43		717.14	623.50	535.5
Hardness	432.87		380.71	330.50	347.94
Iron - Total	0.46		0.29	0.00	0.13
Iron - Dissolved	0.12		0.05	0.00	0.06
Magnesium	51.47		45.78	40.64	41.86
Mangenese - Total	0.05		0.03	0.00	-
Mangenese -Dissolved	0.10		0.01	0.00	0.08
pH(units)	7.28		7.42	7.55	7.41
Potassium	2.68		1.95	1.59	2.13
Sodium	16.69		15.61	13.04	12.96
Sulfate	104.51		82.71	45.25	55.4
TDS	497.64		429.67	364.75	365.13

* Quality parameters reported as mg/l unless otherwise noted
** Data: Database input restricted to values greater then laboratory minimum detection limit.
Flow through Meter 4 was combined with Meter 3 in 1995

Table 37

TRAIL MOUNTAIN

SPRING DISCHARGE RECESSION STUDY

YEAR 2015

The springs in Table 33 have been removed from the hydrologic monitoring program as a result of the purchase agreement between PacifiCorp and Bowie Resource Partners LLC (June 2015)

Tabel 38

TRAIL MOUNTAIN YEARLY SPRING DISCHARGE VARIATIONS (GPM)

Note: Springs within the Trail Mountain Mining Unit transferred out of the Hydrologic Monitoring Program as a result of the purchase agreement between PacifiCorp and Bowie Resource Partners LLC (June 2015)

Tabel 39

TRAIL MOUNTAIN YEARLY SPRING WATER QUALITY

Note: Springs within the Trail Mountain Mining Unit transferred out of the Hydrologic Monitoring Program as a result of the purchase agreement between PacifiCorp and Bowie Resource Partners LLC (June 2015)

TABLE 40: DEER CREEK IN-MINE WATER QUALITY *

2015*** SAMPLE DATES	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON DISSOLVED	MAGNESIUM	MANGANESE	PH (units)	POTASSIUM	SODIUM	SULFATE	TDS
TW-10														
20150318	306.0	69.6	0.0	5.0	630.0	329.0	0.0	37.7	0.0	7.4	1.2	15.1	45.0	351.0
		Deer Creek Portals Sealed in April 2015												
2014***														
MIN	293.0	66.8	0.0	4.0	651.0	308.0	0.0	34.2	0.0	7.2	1.3	14.6	45.0	354.0
MAX	307.0	71.4	0.0	5.0	657.0	326.0	0.0	36.2	0.0	7.5	1.7	17.0	46.0	371.0
MEAN	303.0	69.7	0.0	4.3	654.5	320.0	0.0	35.4	0.0	7.4	1.4	15.8	45.5	363.8
2013***														
MIN	301	69	0	4	652	315	0	35	0	7	1	15	44	345
MAX	306	75	0	6	661	347	0	39	0	7	2	18	46	375
MEAN	304	72	0	5	657	329	0	36	0	7	1	17	45	359
2012***														
MIN	316	72	0	4	655	331	0	37	0	7	1	16	45	346
MAX	322	74	0	4	659	337	0	37	0	7	1	16	46	353
MEAN	319	73	0	4	657	334	0	37	0	7	1	16	46	350
2011***														
MIN	305	72	0	4	618	326	0	36	0	7	1	15	44	333
MAX	317	75	0	4	640	343	0	38	0	7	1	17	47	378
MEAN	309.25	73.16	0.00	4.00	633.50	334.00	0.00	36.75	0.00	7.45	1.32	16.01	45.25	364.75
HISTORICAL 1988-2014														
MIN	279	61.3	0.0	0.4	450	279	0.00	18.70	0.000	6.60	0.01	9.81	27	313
MAX	714	211.0	5.0	30.0	950	732	1.17	77.10	1.210	8.40	5.00	55.03	350	505
MEAN	354.00	76.13	0.82	6.34	637.13	344.38	0.09	36.60	0.05	7.39	1.37	15.58	49.23	373.40
MN-ME**														
20150318	344	100	0	7	911	500	0	61	0	8	3	19	182	618
		Deer Creek Portals Sealed in April 2015												
2014***														
MIN	291	78	0	7	835	415	0	53	0	8	3	18	152	518
MAX	329	97	0	8	942	491	0	60	0	8	4	19	184	591
MEAN	311	85.82	0.0	7	883	447	0	56.56	0.0	8.09	3.12	18.41	167	554
2013***														
MIN	289	79	0	6	823	426	0	55	0	8	3	18.62	138	483
MAX	324	88	0	7	870	456	0	57	0	8	3	21.52	162	540
MEAN	306	84	0	7	844	440	0	56	0	8	3	20.08	150	517
2012***														
MIN	303	84	0	7	838	432	0	54	0	8	3	19.52	137	496
MAX	338	94	0	7	866	472	0	57	0	8	3	20.04	150	529
MEAN	321	89	0	7	852	452	0	56	0	8	3	19.78	144	513
2011***														
MIN	319	85	0	6	821	434	0	54	0	8	3	19.76	150	522
MAX	347	97	0	7	865	488	0	60	0	8	3	19.96	161	575
MEAN	332	93	0	7	850	467	0	57	0	8	3	19.86	156	557
HISTORICAL 1991-2014														
MIN	289	69.0	0.0	4.0	500	329	0.00	37.60	0.000	6.90	0.74	14.90	40.00	240
MAX	475	120.3	23.0	25.0	1139	590	2.81	70.43	0.200	8.23	14.00	37.16	218.00	678

TABLE 41: DEER CREEK MINE - DISCHARGE WATER QUALITY*

Note: Deer Creek Mine portals sealed in April 2015.

	2015**					Historical - (1976-2014)			
Parameters	*Minimum*	*Maximum*	*Mean*	*No. of Analysis*		*Minimum*	*Maximum*	*Mean*	*No. of Analysis*
Acidity	0	0	0	0		0.10	97.00	13.28	282
Chloride	8.00	13.00	10.25	4		0	285.00	18.85	454
Conductivity (un	744.00	915.00	828.50	4		480.00	1900.00	898.64	468
Iron - Total	0.02	1.06	0.52	4		0.01	7.53	0.61	466
Oil & Grease	*No oil and grease sheen noted during sampling*					0.10	48.80	3.21	254
pH (units)	7.22	7.44	7.33	4		6.52	8.51	7.48	456
Sulfate	73.00	203.00	125.00	4		13.00	518.00	170.09	462
TDS	437.00	607.00	517.75	4		289.00	1111.00	569.84	474
TSS	0	6.00	3.00	4		0	2784.00	44.27	403

* Quality parameters reported as mg/l unless otherwise noted.

** Data: Database input restricted to values greater than laboratory minimum detection limit.

TABLE 42

WILBERG/COTTONWOOD IN-MINE WATER QUALITY

Mine Sealed May 2001 - In-Mine Monitoring Discontinued

TABLE 43 : WILBERG/COTTONWOOD - DISCHARGE WATER QUALITY

GRIMES WASH*

	2014					Historical - (1976-2001)			
	Min	Max	Mean	No. of Analysis		Min	Max	Mean	No. of Analysis
pH	No Discharge During 2014					6.9	8.47	7.7	273
Acidity						0.1	62	10.61	193
Bicarb. Alkalinity						190	539	364	173
Chloride						0.6	80	17.5	247
Conductivity						490	1611	1041	205
Iron						0.01	3	0.33	233
Oil & Grease						0.1	23.8	2.3	193
Sulfate						29.2	600	264	249
TDS						407	1287	672	273
TSS						0.1	222	7.8	262

TMA001*

	2015					Historical - (2001-2014)			
	Min	Max	Mean	No. of Analysis		Min	Max	Mean	No. of Analysis
Acidity	0	0	0.00	0		6.00	6.00	6.00	1
Chloride	10.00	26.00	14.67	12		0.00	41.00	16.00	164
Conductivity (umhos/cm)	955.00	1096.00	1061.17	12		1062.00	1436.00	1146.10	164
Iron - Total	0.00	0.12	0.02	12		0.00	0.40	0.03	88
Oil & Grease	No Visual Oil & Grease Noted in 2015								
pH (units)	7.29	7.90	7.41	12		6.20	8.08	7.38	163
Sulfate	141.00	227.00	203.42	12		172.00	322.00	249.24	164
TDS	703.00	788.00	717.25	12		667.00	803.00	744.71	164
TSS	0	11.00	1.50	12		0.00	14.00	1.30	91

* Discharge Re-located From Grimes Wash to TMA July 2001
ND - Not Detected

TABLE 44: TRAIL MOUNTAIN IN-MINE WATER QUALITY *

Note: Springs within the Trail Mountain Mining Unit transferred out of the Hydrologic Monitoring Program as a result of the purchase agreement between PacifiCorp and Bowie Resource Partners LLC (June 2015)

Tabel 45

TRAIL MOUNTAIN - DISCHARGE WATER QUALITY

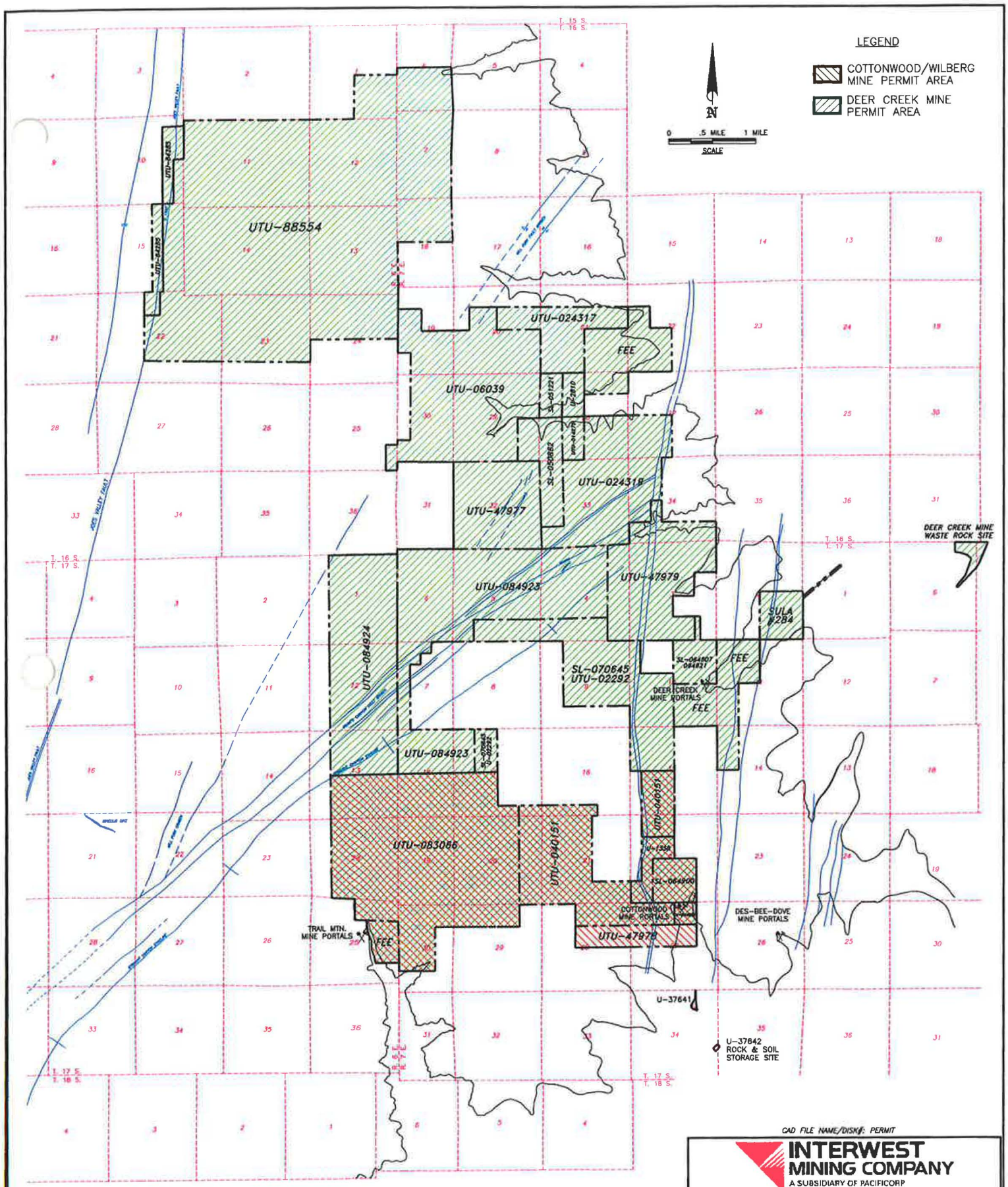
@ COTTONWOOD CANYON AND OLIPHANT PORTALS

These sites were removed from the hydrologic monitoring program in 2014.

TABLE 46: WELLS - WATER QUALITY *

2015* SAMPLE DATES	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	HARDNESS	IRON DISSOLVED	MAGNESIUM	MANGANESE	PH (units)	POTASSIUM	SODIUM	SULFATE	TDS
DEER CREEK - DCWR-1														
20150310	680	57.14	0	441	17810	501	0.55	87.12	0	7.93	8.79	2785.9	4609	15800
20150603	678	86.06	0	792	17660	768	0.46	134.39	0.008	7.65	11.49	4316.3	6894	15172
20150914	659	84.68	0	619	17600	836	0.09	142.52	0.009	7.54	28.34	4673.4	8276	15208
20151201	673	83.07	0	886	17360	845	0.9	148.2	0.01	7.77	12.85	4655	8832	15166
HISTORICAL 1989-2014:														
MIN	426.00	82.07	0.00	17.00	17290.00	318.00	0.08	4.54	0.00	7.34	6.12	3977.50	5664.00	11466.00
MAX	426.00	82.07	0.00	17.00	17290.00	318.00	0.08	4.54	0.00	7.34	6.12	3977.50	5664.00	11466.00
MEAN	727.58	149.84	4.13	766.45	21402.80	1132.98	1.44	184.10	0.04	7.73	17.36	5776.91	11365.54	18505.05
WILBERG/COTTONWOOD - CWRW-1														
20150317	453	239	0	1843	13,740	2149	0	377	0	8	25	1,884	3,442	11,966
20150604	518	320	0	1912	15,360	3294	2	606	0	7	28	2,865	6,632	13,751
This site was transferred to Bowie Resource Partners LLC in June 2015														
HISTORICAL 1989-2014:														
MIN	233	132	0	280	10,666	1629	0	138	0	7	8	851	750	5,231
MAX	864	1135	26	4020	120,000	8327	15	1717	2	8	122	8,812	24,000	30,440
MEAN	418	381	1	2293	20,557	3827	3	694	0	8	36	3,734	8,063	15,563
TRAIL MOUNTAIN TM-1B														
20150317	422	9	22	61	1,061	56	1	8	0	8	2	222	13	609
20150604	455	8	0	59	1,032	55	1	8	0	9	2	216	14	669
This site was transferred to Bowie Resource Partners LLC in June 2015														
HISTORICAL 1987-2014:														
MIN	304	2	0	16	783	7	0	1	0	7	1	5	0	402
MAX	1015	14	164	717	4,580	72	3	11	0	10	16	1,316	664	3,290
MEAN	483	9	23	65	1,083	57	1	8	0	8	3	234	22	637

*** Quality parameters are reported as mg/l unless otherwise noted.**
**** Data: Database input restricted to values greater than laboratory minimum detection limit.**



CAD FILE NAME/DISK#: PERMIT

INTERWEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP

MINE PERMIT BOUNDARIES

DRAWN BY: K. LARSEN	FIGURE 1	
SCALE: AS NOTED	DRAWING #:	
DATE: MARCH 17, 2016	SHEET 1 OF 1	REV.

Figure 2

East Mountain Precipitation

2015 Water Year

Total Precipitation = 13.08 Inches

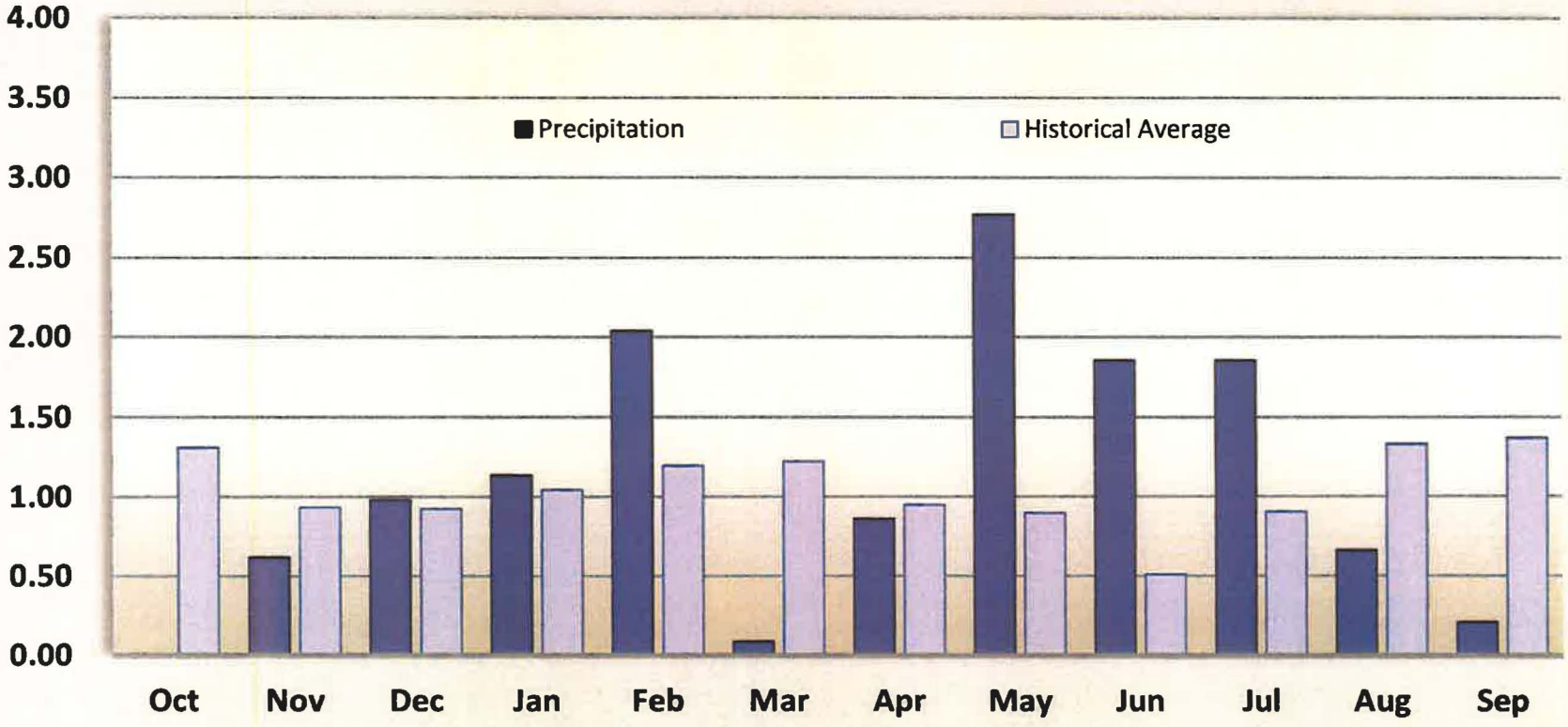


FIGURE 3

EAST MOUNTAIN - MILL FORK

SPRING DISCHARGE vs. PRECIPITATION vs. TEMPERARURE

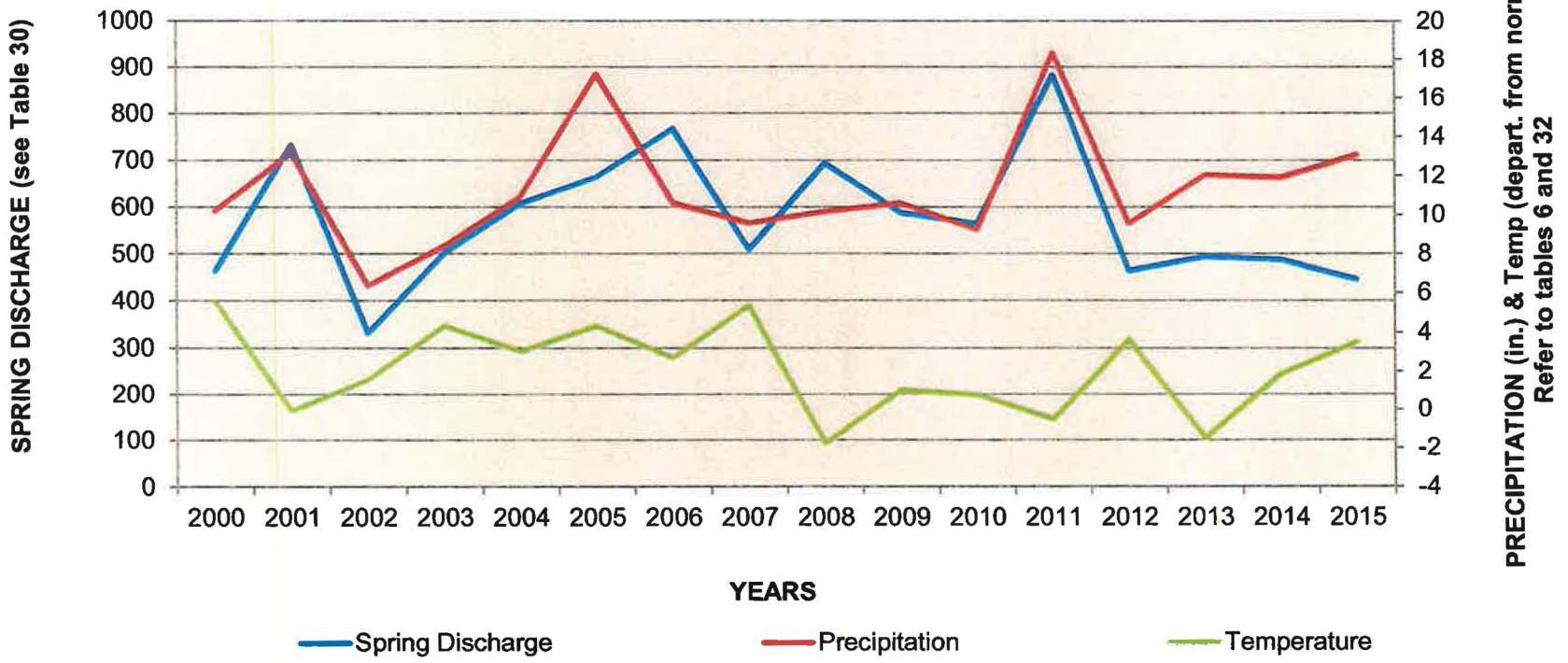


FIGURE 4a

NORTH EMERY WATER USERS SPECIAL SERVICES DISTRICT

RILDA CANYON SPRINGS

Note: Flow data for NEWUSSD is collected by North Emery Water staff.

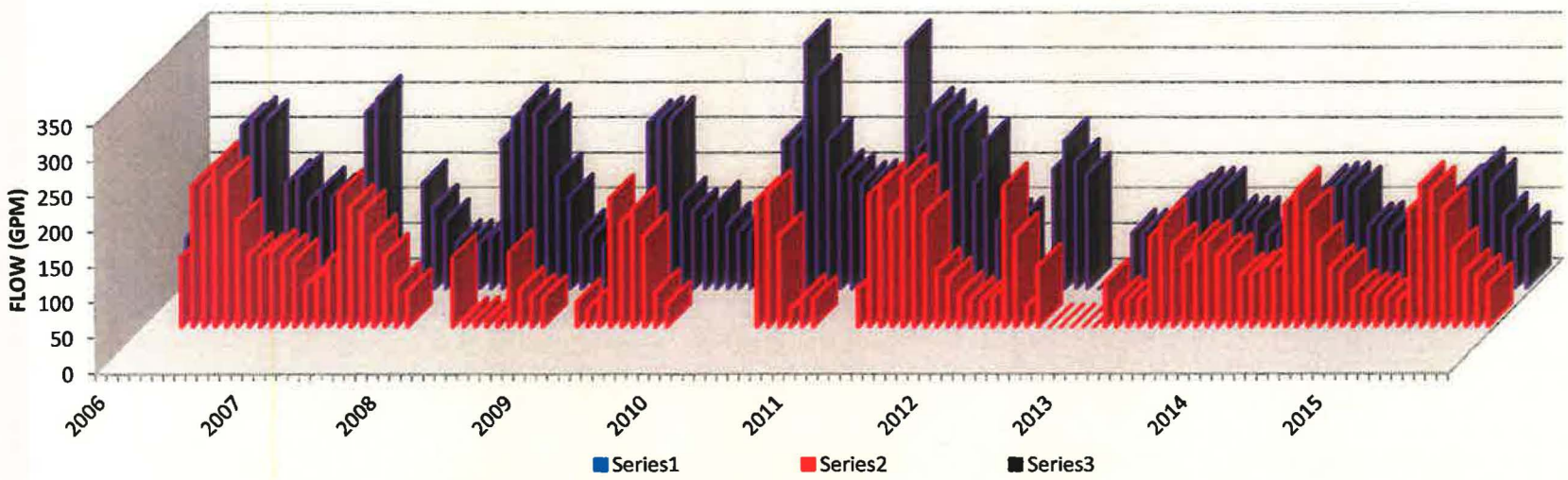


FIGURE 4b

NORTH EMERY WATER USERS SPECIAL SERVICES DISTRICT
MONTHLY RILDA CANYON SPRINGS USEAGE (10 YR)

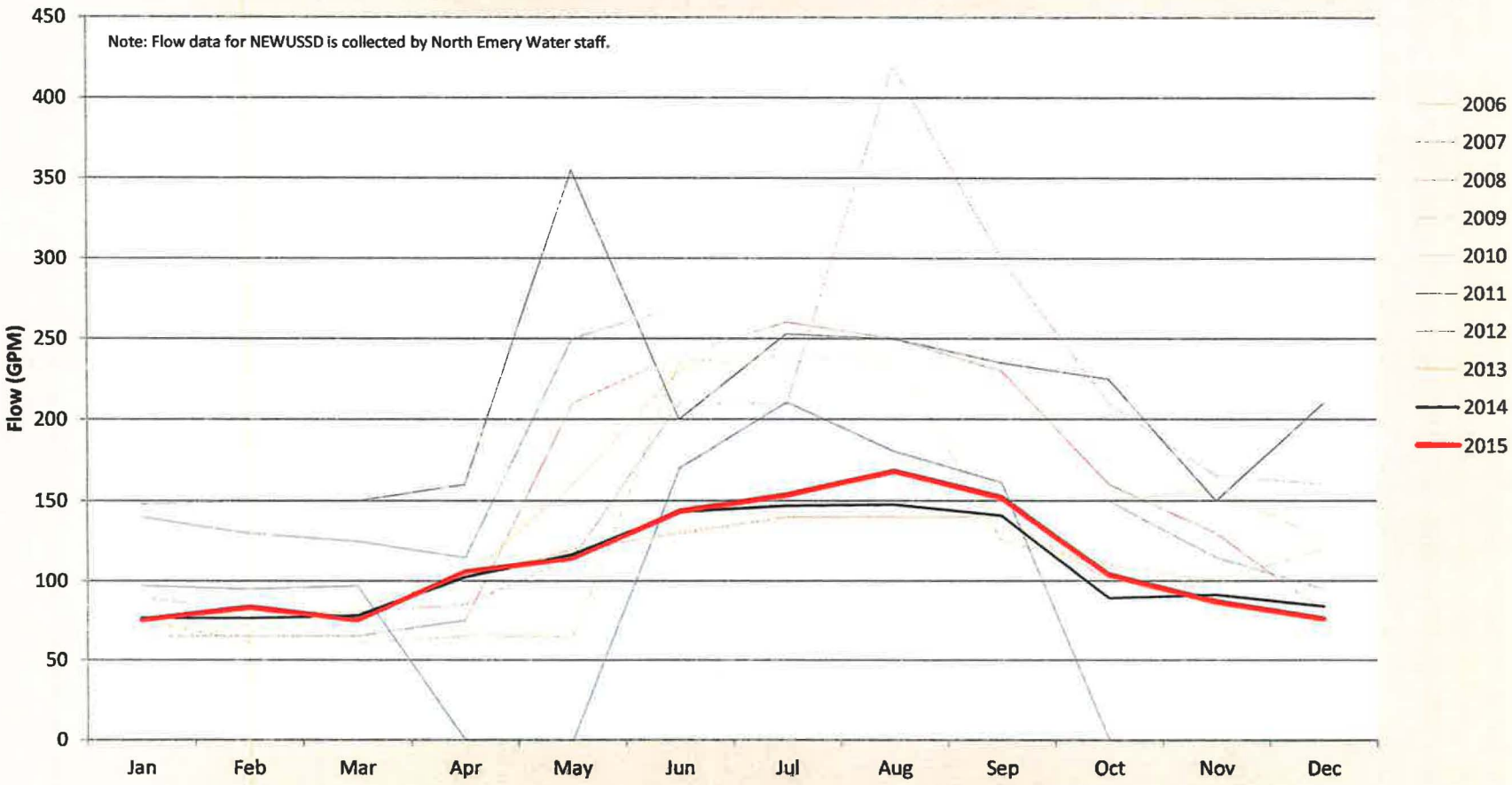


FIGURE 4c

CASTLE VALLEY SPECIAL SERVICES DICTRICT
MONTHLY LITTLE BEAR SPRING USEAGE (10 YR)

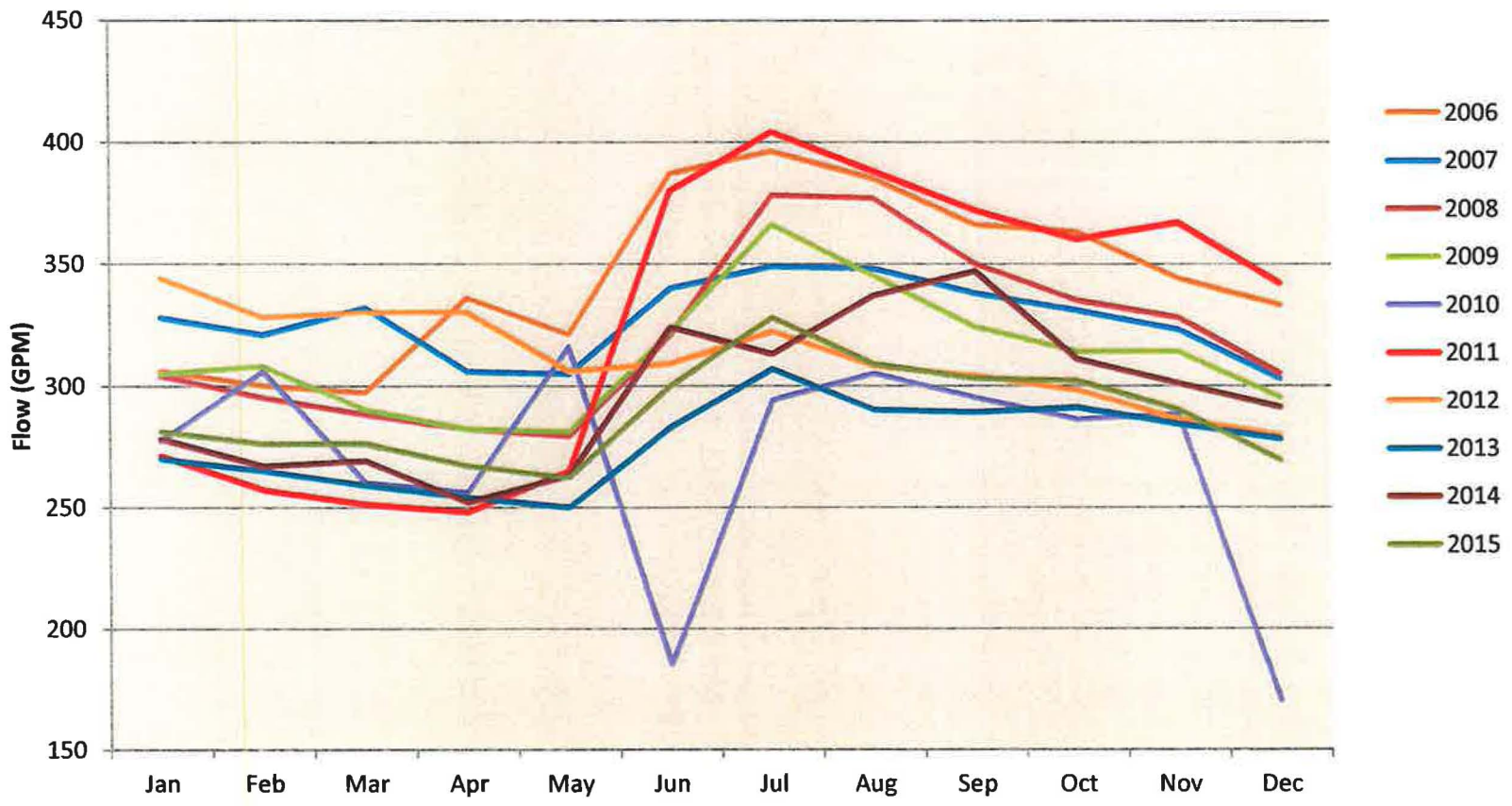


Figure 7
Deer Creek Mine
2015 Mine Water Discharge

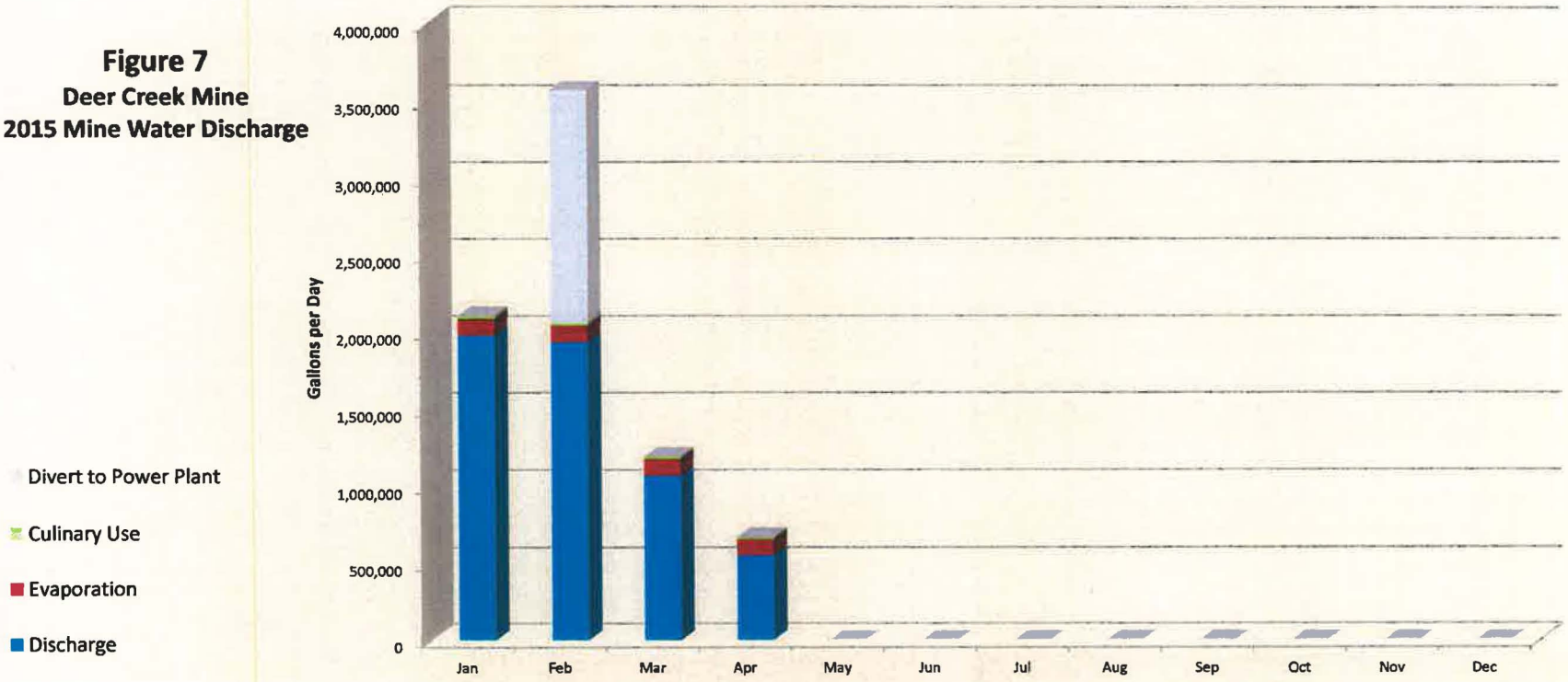


FIGURE 8

DEER CREEK MINE DISCHARGE

@ Deer Creek (UPDES UT-0023604)

January 1980 through April 2015

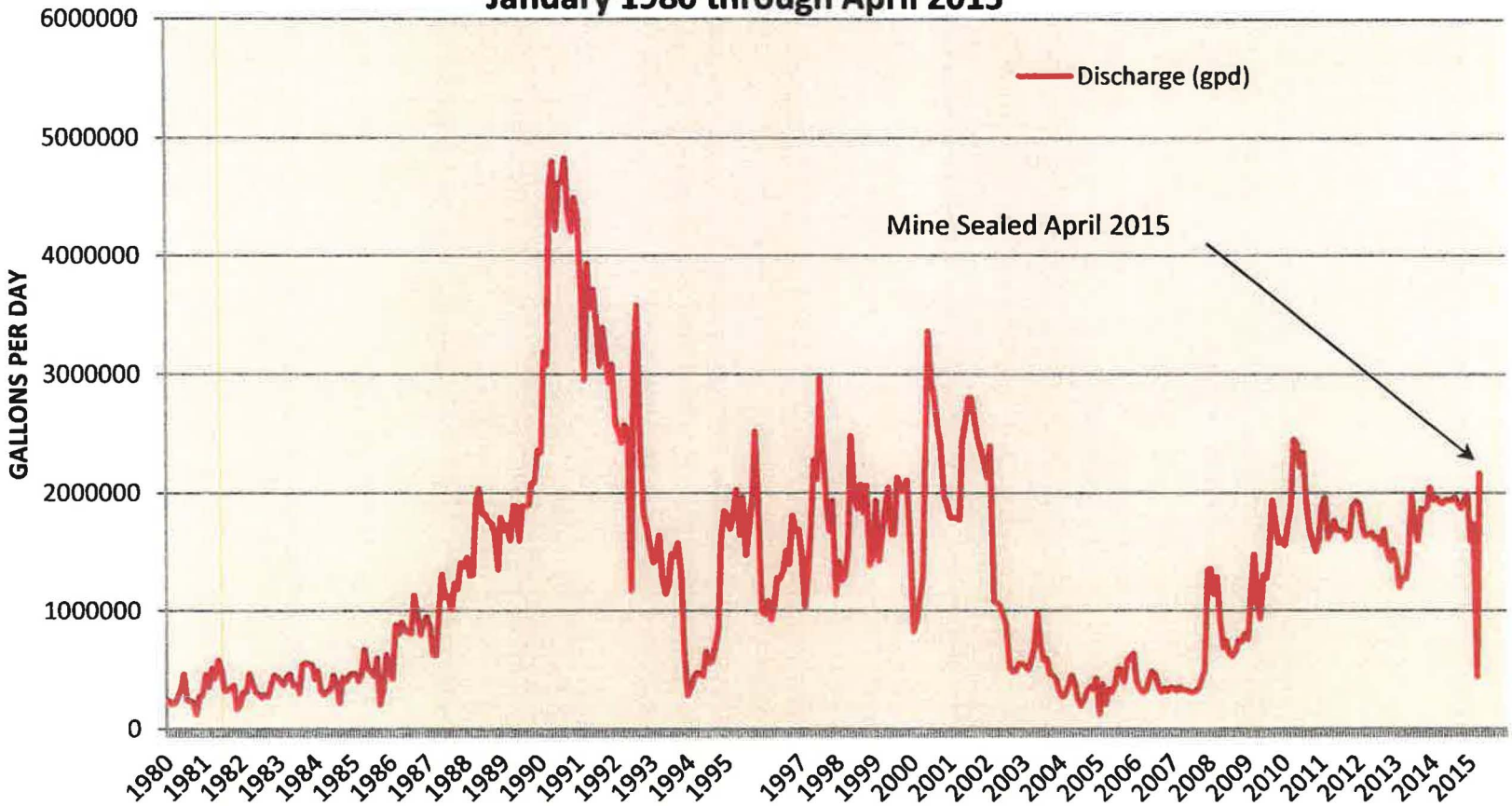


FIGURE 10

WILBERG/COTTONWOOD MINE DISCHARGE
@ Grimes Wash/TMA (UPDES UT-0022896)
April 1979 through December 2015

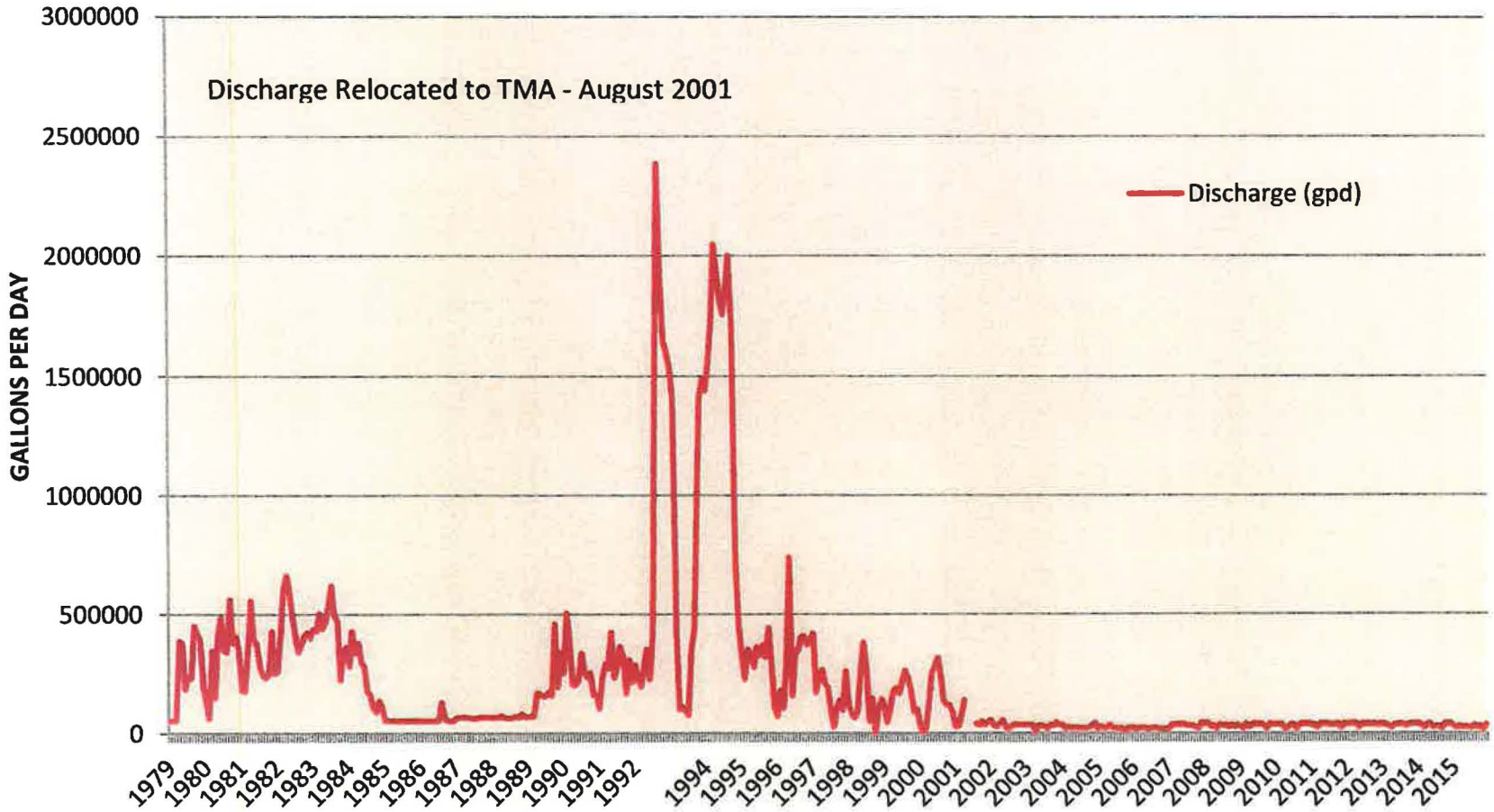
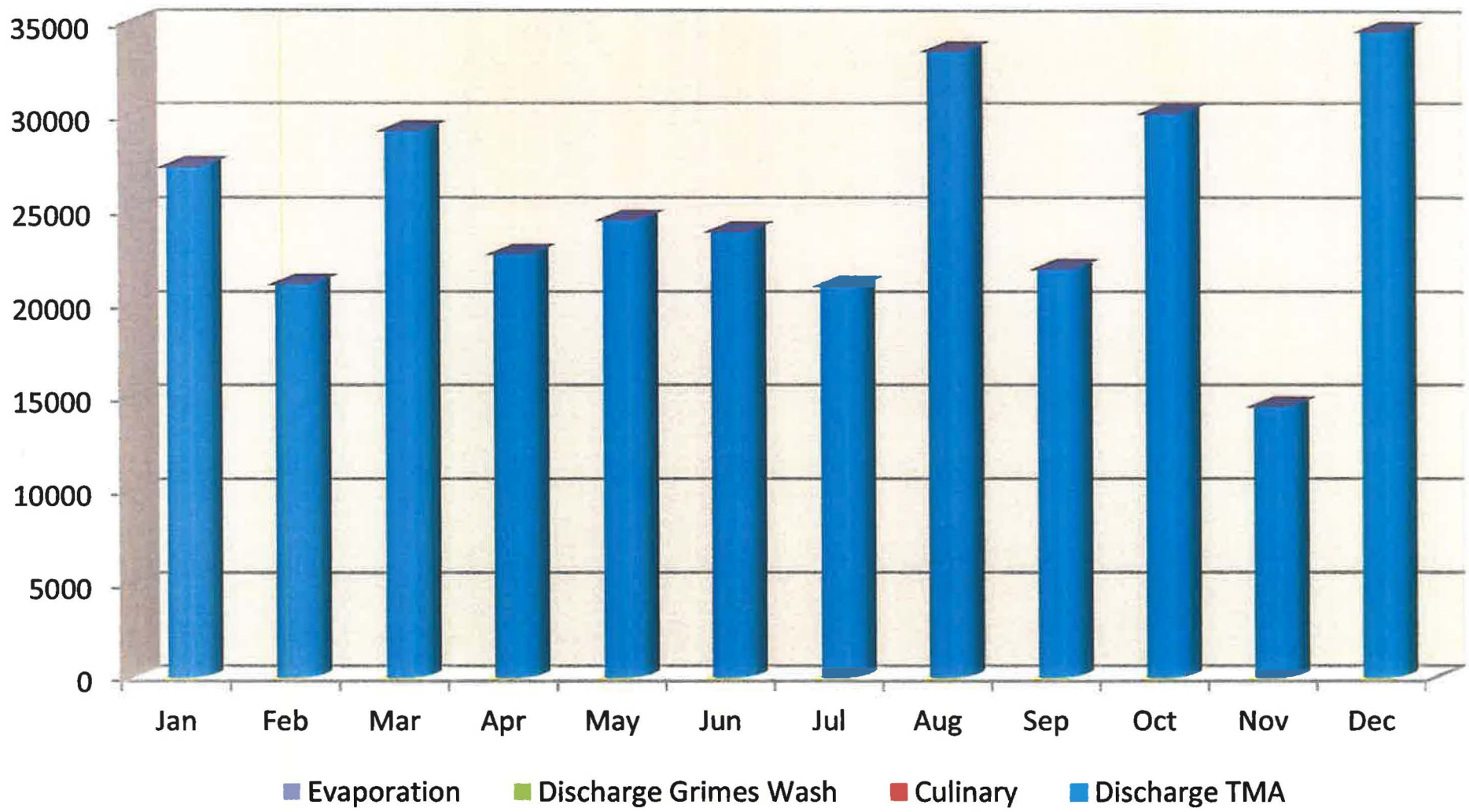


FIGURE 11

WILBERG/COTTONWOOD (TMA001)

2015 MINE WATER DISCHARGE



PacifiCorp Energy - Electric Lake
Daily Discharge (cubic feet per second)
2015 Water Year

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	11.56	7.96	8.98	10.98	7.01	6.25	6.63	16.91	7.04	19.73	19.04	21.71
2	11.54	7.78	8.98	5.57	7.03	6.30	6.63	10.66	6.73	19.74	19.06	21.74
3	11.54	7.78	8.98	5.13	7.01	6.41	6.61	10.66	6.27	19.68	19.07	21.76
4	11.85	7.78	8.98	5.13	7.01	6.35	6.53	10.66	6.25	19.73	22.16	22.27
5	12.04	7.81	7.60	5.15	7.01	6.28	6.63	10.66	6.51	19.68	22.46	22.43
6	12.05	7.77	7.01	5.13	7.01	8.79	6.63	10.66	6.28	16.14	16.52	22.43
7	12.47	7.39	9.57	5.81	7.01	10.68	6.63	10.66	6.25	10.11	14.86	22.43
8	12.47	6.91	9.64	6.28	7.01	10.66	12.67	10.66	6.25	7.05	18.42	19.71
9	12.50	6.66	6.10	6.25	7.01	10.66	18.20	11.10	6.25	7.04	18.43	20.45
10	12.64	6.38	6.63	6.28	7.01	10.66	19.04	11.10	6.26	9.63	18.46	21.42
11	12.97	5.96	6.63	6.25	7.01	10.65	19.04	11.10	6.25	11.13	19.76	26.85
12	12.98	5.17	6.63	6.25	7.01	10.63	19.09	11.18	6.28	11.10	20.43	30.71
13	9.29	5.13	6.63	6.25	7.09	10.59	19.04	11.76	6.25	11.10	20.34	30.78
14	7.27	5.54	6.63	6.25	7.01	10.62	20.26	10.10	6.25	14.39	20.37	31.23
15	7.96	5.50	6.63	6.21	7.20	10.64	21.02	8.98	6.25	17.80	20.40	24.00
16	9.65	8.53	8.96	6.58	6.34	10.66	21.02	8.98	6.41	17.85	20.34	20.44
17	19.13	12.00	10.66	7.01	5.50	10.65	21.02	9.03	6.33	16.95	20.38	21.02
18	20.47	12.00	10.66	7.01	5.50	10.66	21.32	8.98	6.25	16.69	20.46	16.88
19	19.62	12.00	10.68	7.01	5.98	8.17	21.74	7.65	6.42	16.63	20.36	13.50
20	19.23	12.00	10.66	7.01	6.25	7.01	21.71	6.25	6.25	16.68	20.34	13.46
21	18.40	12.00	10.68	7.01	6.25	7.01	29.36	6.25	6.44	17.74	20.36	13.46
22	13.67	12.00	10.66	7.01	6.28	7.01	35.73	6.28	6.63	18.57	20.65	11.50
23	10.15	12.00	10.69	7.04	6.25	7.01	35.73	6.25	9.42	18.59	20.75	9.82
24	9.80	12.00	10.66	7.01	6.25	7.01	35.73	6.42	11.53	18.41	21.02	9.80
25	9.52	10.19	10.66	6.94	6.27	7.01	35.76	6.28	11.35	18.41	15.82	9.83
26	9.33	8.98	10.69	6.94	6.25	7.04	35.73	6.64	11.87	18.43	22.06	9.84
27	8.98	9.01	10.66	7.01	6.28	7.01	35.73	5.84	12.58	18.80	23.16	9.82
28	8.46	9.01	11.02	7.01	6.25	7.01	35.73	6.24	12.47	19.05	23.23	11.00
29	8.17	8.98	11.13	7.04		7.01	35.73	7.01	12.47	19.08	22.81	12.47
30	8.20	9.00	11.14	7.01		6.80	32.34	7.01	15.91	18.99	21.71	13.95
31	8.17		11.10	7.01		6.66		7.01		19.09	21.74	
Avg CFS	12.00	8.71	9.24	6.60	6.61	8.38	21.63	9.00	7.92	16.26	20.16	18.56
Max	20.47	12.00	11.14	10.98	7.20	10.68	35.76	16.91	15.91	19.74	23.23	31.23
Min	7.27	5.13	6.10	5.13	5.50	6.25	6.53	5.84	6.25	7.04	14.86	9.80

Minimum Flow	5.13
Maximum Flow	31.23

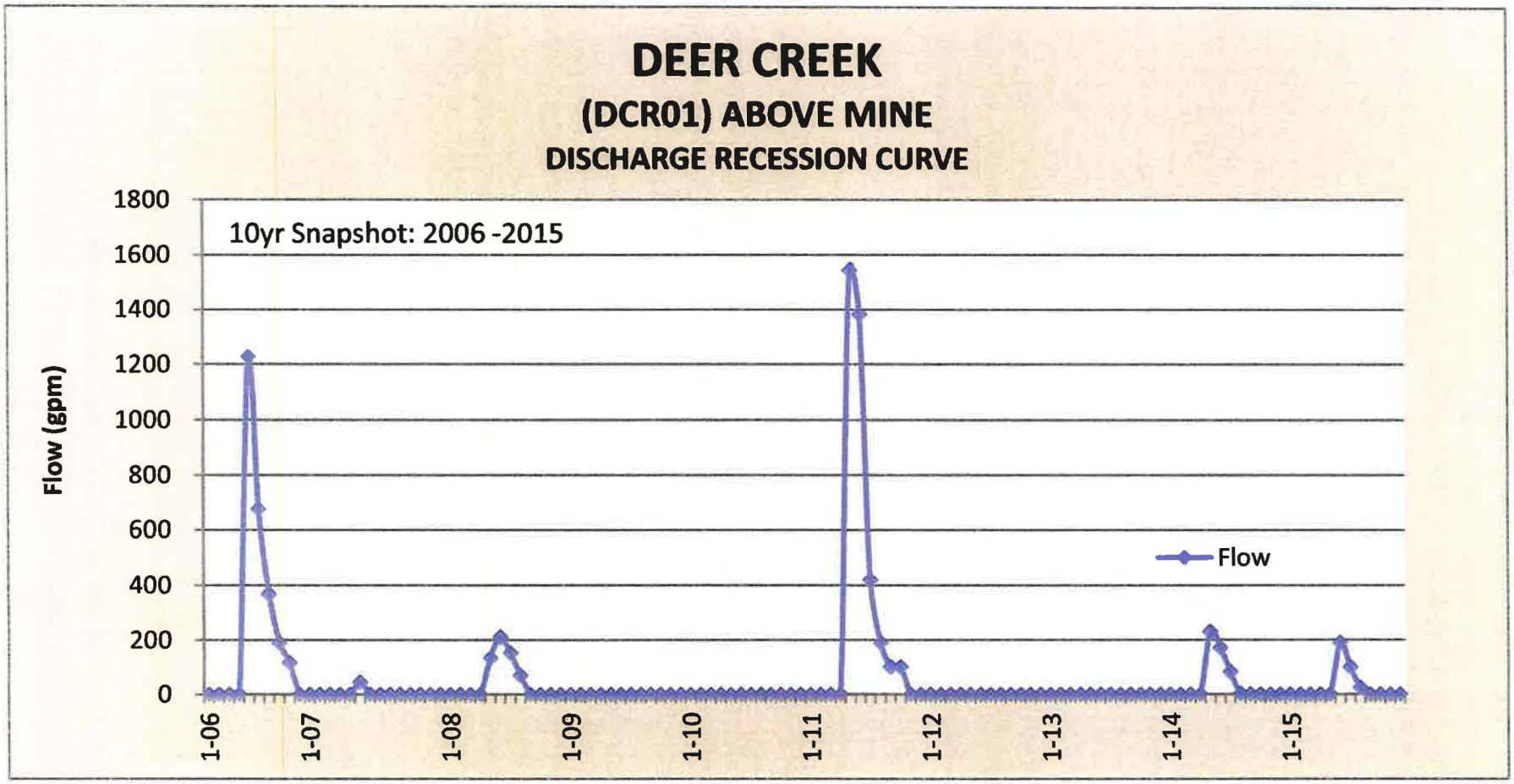
Total Discharge for 2015 Water Year (ac-ft)	8768.12

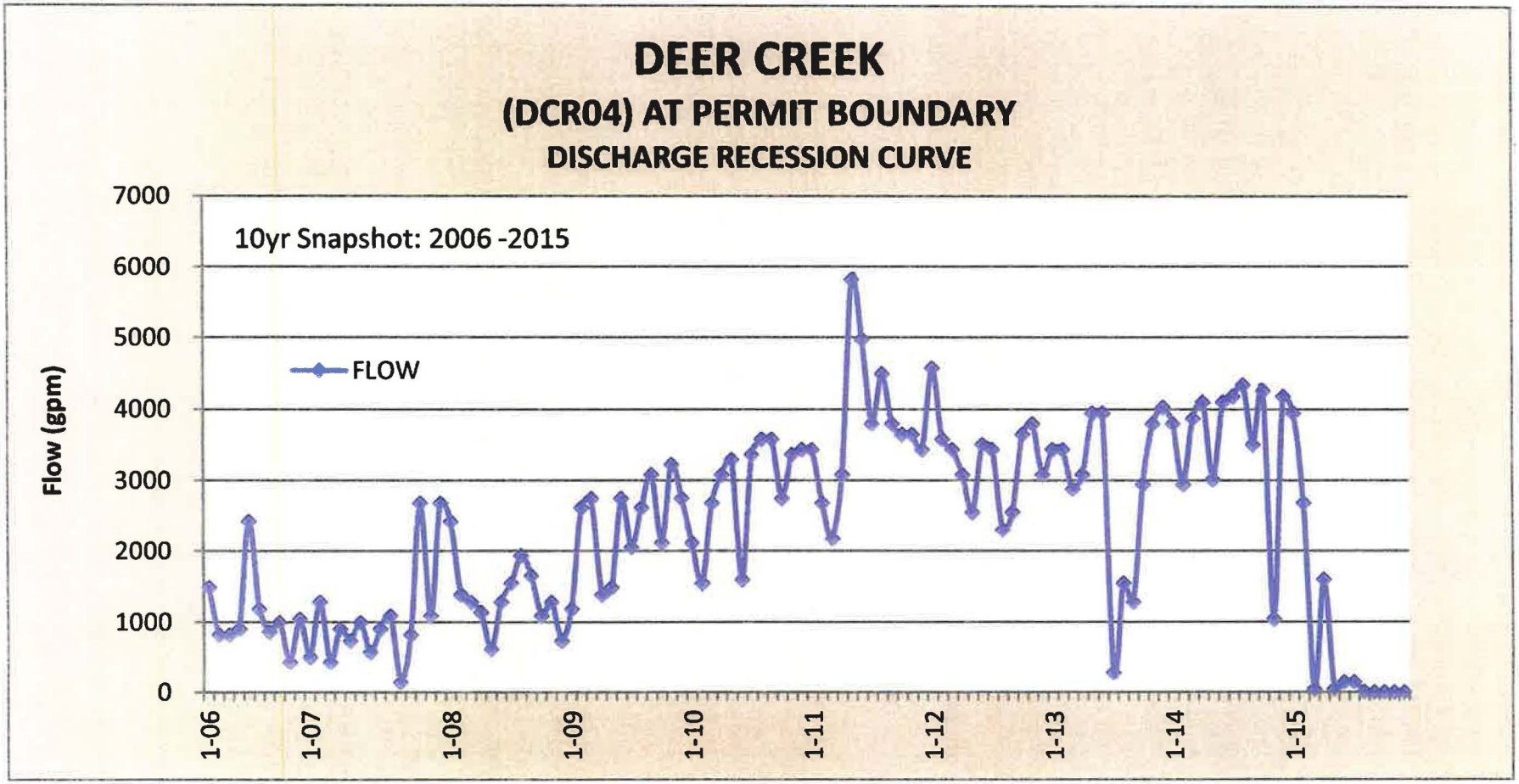
PacifiCorp Energy - River Flows Above Huntington Plant
Daily Flow (cubic feet per second)
2015 Water Year

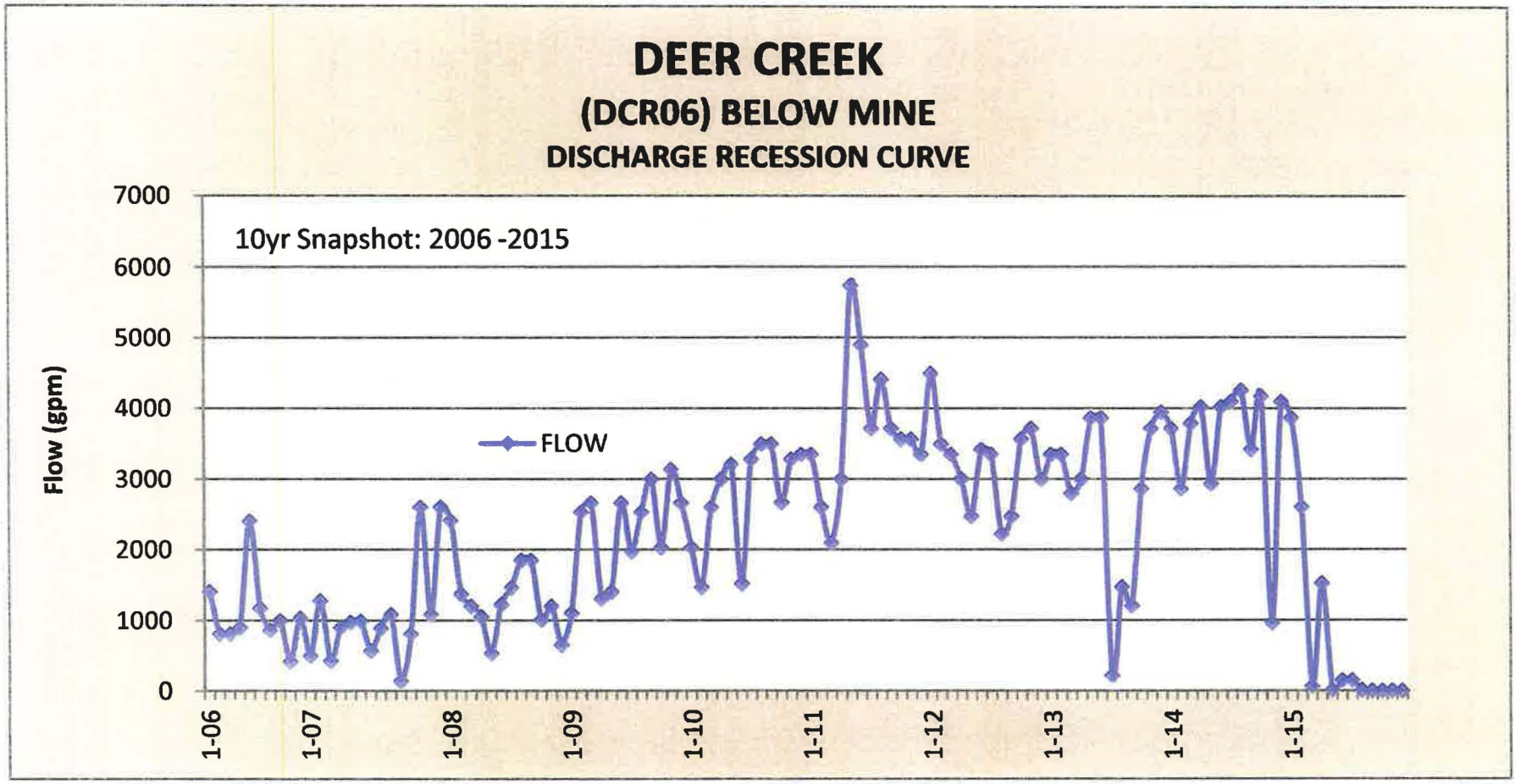
Day	October	November	December	January	February	March	April	May	June	July	August	September
1	51.04	21.42	28.88	21.64	31.11	23.32	41.37	70.30	115.20	97.90	86.50	73.80
2	51.54	23.03	28.73	25.75	32.11	24.35	36.08	65.22	136.50	97.30	88.60	61.24
3	51.53	22.31	29.67	30.75	32.87	22.68	30.24	71.40	138.20	97.10	99.60	59.72
4	51.76	18.89	28.92	28.45	33.51	22.56	29.02	66.68	132.40	97.80	86.30	61.19
5	50.81	20.33	27.78	29.30	32.52	25.73	30.37	68.21	127.70	99.80	80.10	62.83
6	50.88	20.02	25.43	30.39	32.77	20.63	32.11	80.60	121.40	99.40	86.90	61.04
7	50.80	16.14	24.63	27.90	33.60	22.06	30.35	74.10	126.20	99.30	80.00	61.08
8	37.34	14.03	23.52	26.70	34.12	22.02	31.50	66.86	107.80	93.90	77.50	60.66
9	27.96	14.30	15.41	24.53	33.46	24.34	36.80	63.15	107.20	92.60	76.60	58.82
10	28.19	15.01	17.22	25.39	33.24	25.96	39.43	56.10	108.00	95.00	75.20	71.40
11	28.52	13.66	18.91	27.47	32.01	26.08	43.03	54.56	109.60	86.30	71.70	71.00
12	29.32	18.04	21.25	27.00	30.43	27.37	46.34	65.75	108.20	85.30	62.98	79.10
13	28.04	20.68	21.85	26.68	30.51	26.87	46.65	66.99	103.30	81.00	61.63	79.20
14	21.07	25.08	19.74	24.03	24.17	26.96	50.73	72.80	100.10	84.50	59.04	81.60
15	22.05	22.94	17.78	19.76	24.19	27.87	51.04	78.00	106.00	78.00	57.27	87.30
16	28.54	23.79	19.62	22.91	22.83	29.43	47.24	73.30	98.80	74.30	53.51	92.20
17	30.47	30.10	19.44	24.76	19.65	32.67	45.10	79.20	76.70	69.89	53.31	86.40
18	37.62	29.16	21.61	23.54	22.63	30.56	46.24	73.50	70.30	69.83	57.86	84.20
19	37.49	32.14	19.20	25.39	23.80	30.11	54.06	69.24	66.15	67.87	74.20	84.20
20	37.25	32.65	21.86	25.42	25.25	26.37	53.05	67.58	64.28	68.93	77.20	83.10
21	37.41	28.97	25.59	21.31	23.95	26.72	59.21	65.96	62.74	68.73	85.30	81.50
22	37.24	32.74	28.08	10.91	22.00	26.91	72.10	67.10	60.51	65.35	83.60	76.20
23	33.45	32.30	16.66	17.44	24.52	26.46	71.10	70.60	61.66	66.12	82.90	64.09
24	32.67	30.05	13.98	25.72	24.93	25.47	62.95	68.55	66.04	64.26	89.20	67.15
25	32.27	32.70	20.95	36.05	23.19	24.79	69.76	65.86	74.70	64.35	83.30	78.10
26	32.77	27.94	15.20	31.30	21.40	24.17	64.72	67.55	94.40	64.57	97.00	84.70
27	32.71	25.77	10.09	30.38	23.05	27.84	64.72	78.10	89.30	64.31	95.10	84.20
28	30.53	27.86	14.21	29.53	23.38	32.54	58.49	88.30	86.60	67.71	86.70	83.90
29	28.71	29.76	20.82	29.90		36.73	61.86	93.80	85.10	72.10	86.70	87.60
30	20.88	28.64	17.03	32.12		37.52	63.37	100.00	88.60	81.40	84.90	90.70
31	20.24		17.69	32.32		41.36		109.60		90.70	81.10	
Avg CFS	35.20	24.35	21.02	26.28	27.54	27.37	48.97	72.87	96.46	80.83	78.12	75.27
Max	51.76	32.74	29.67	36.05	34.12	41.36	72.10	109.60	138.20	99.80	99.60	92.20
Min	20.24	13.66	10.09	10.91	19.65	20.63	29.02	54.56	60.51	64.26	53.31	58.82

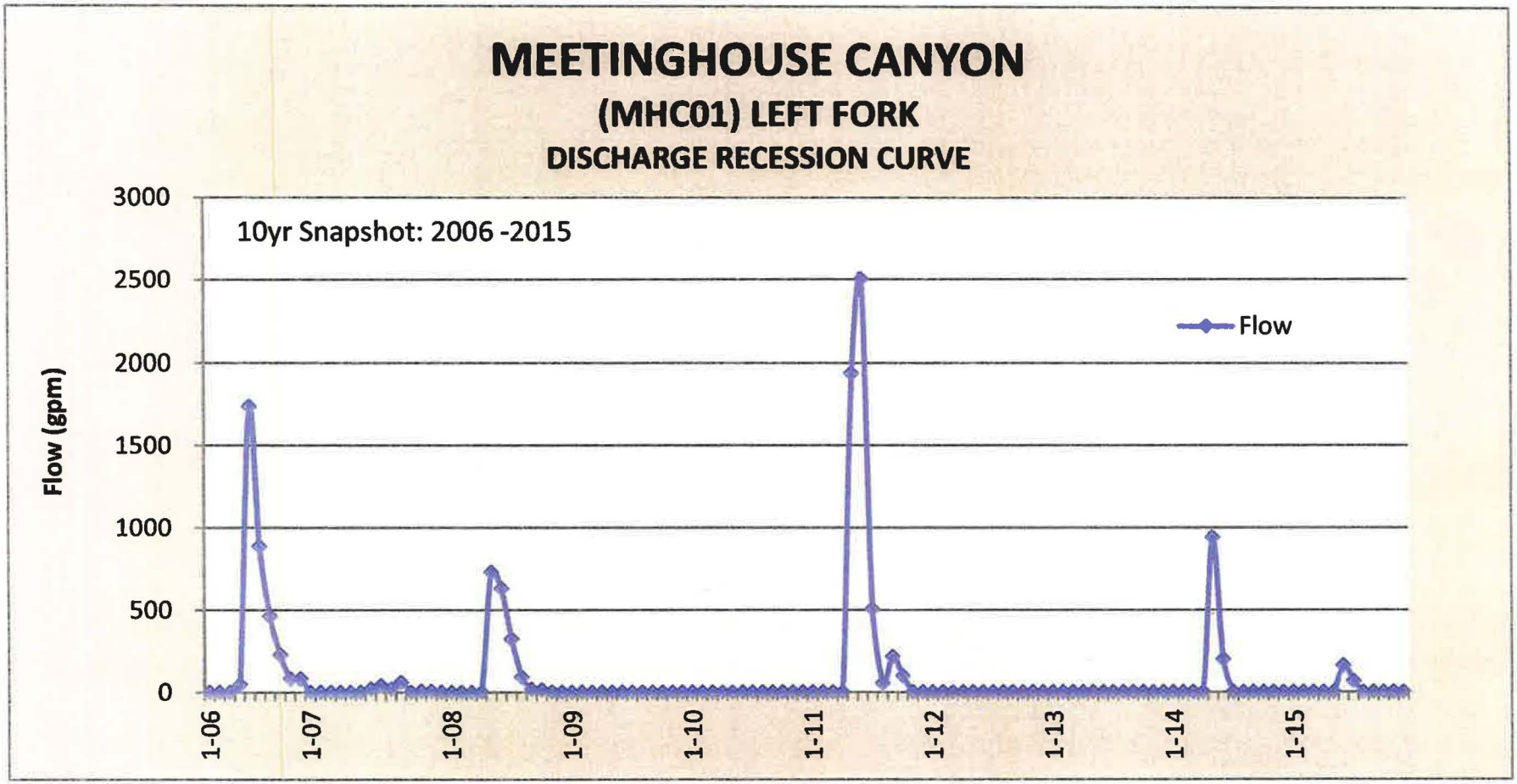
Minimum Flow	10.09
Maximum Flow	138.20

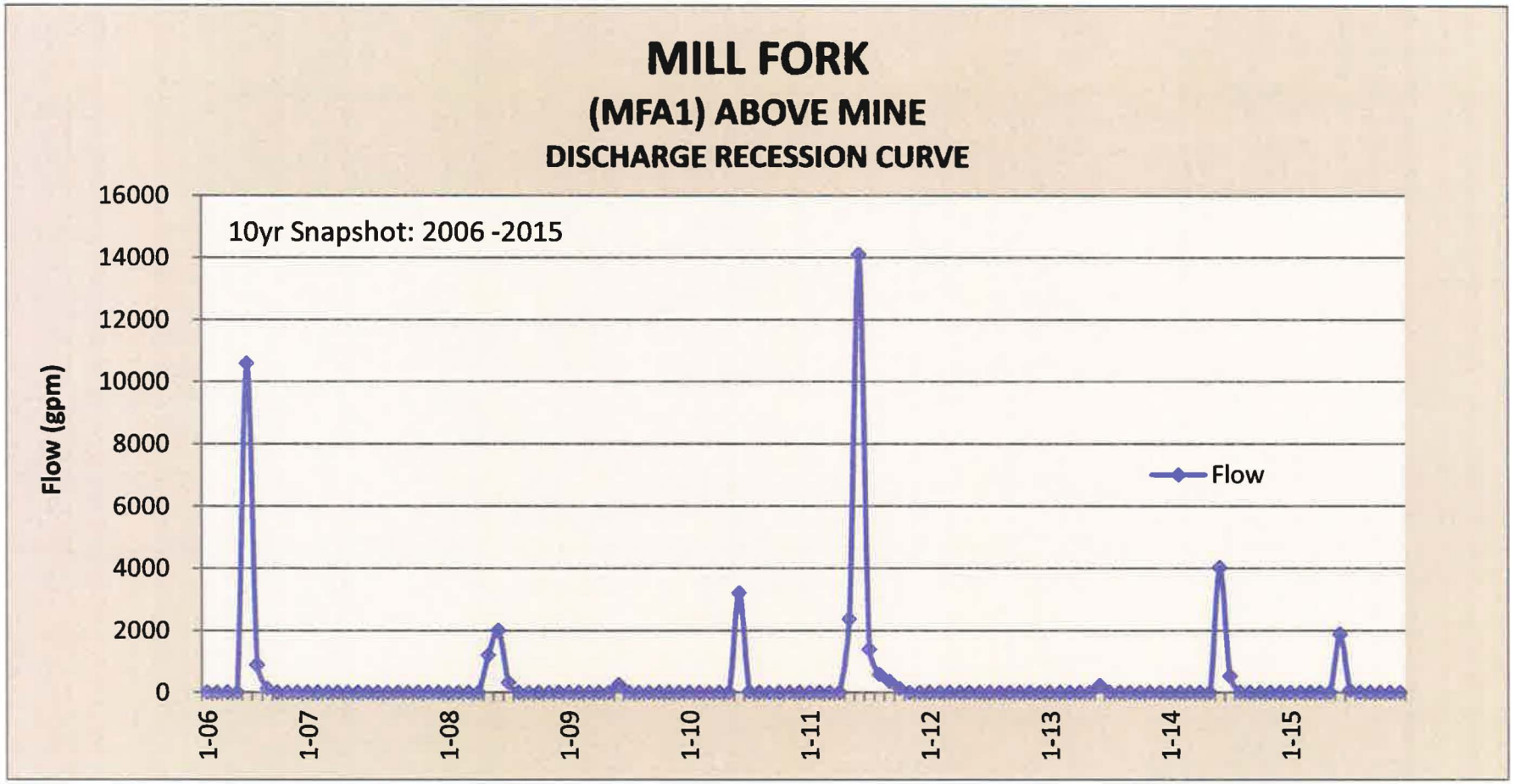
Total Discharge for 2015 Water Year (ac-ft)	37,120.66

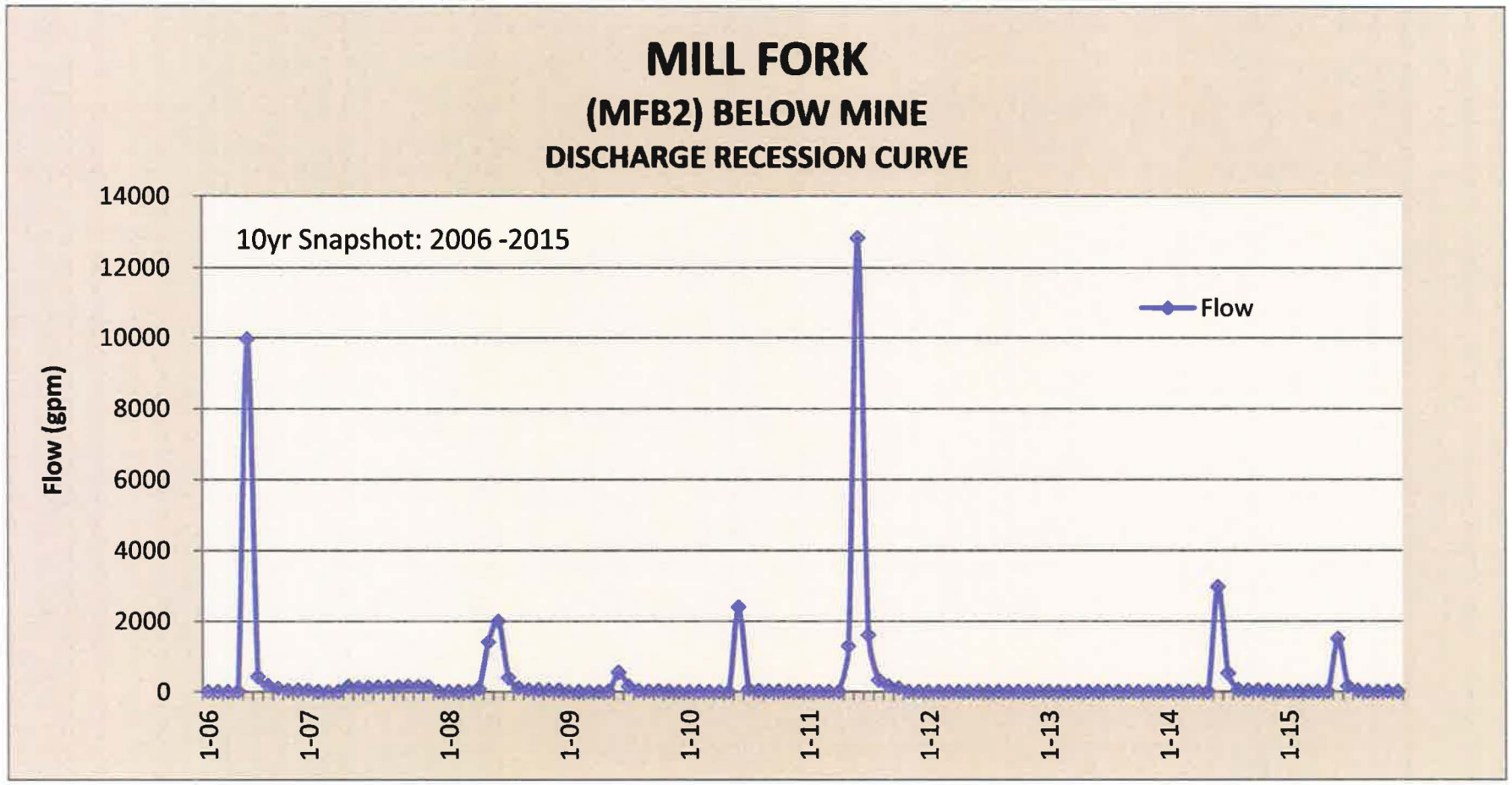

DEER CREEK
(DCR01) ABOVE MINE
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow (gpm)
1800
1600
1400
1200
1000
800
600
400
200
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15
Flow

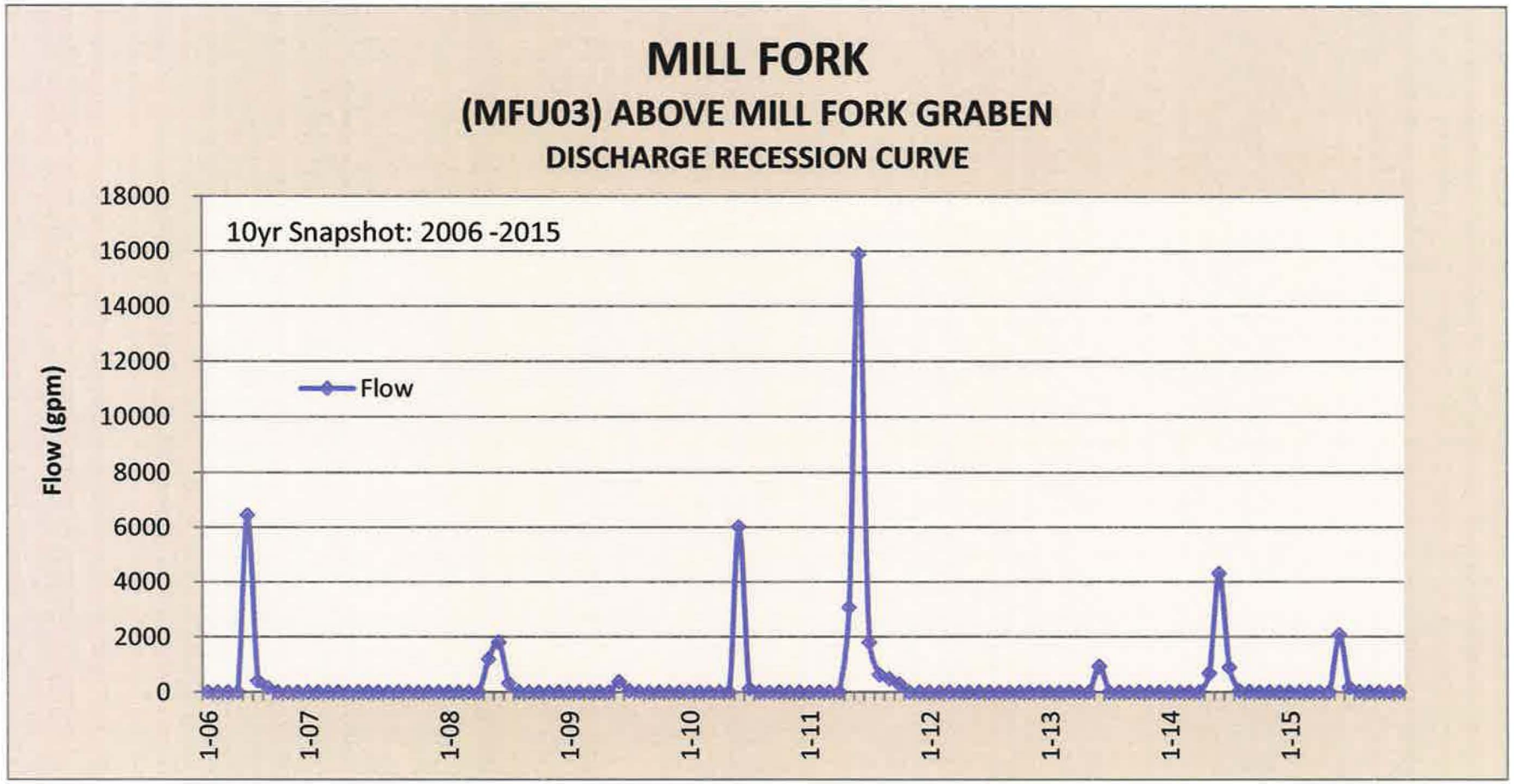

DEER CREEK
(DCR04) AT PERMIT BOUNDARY
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
FLOW
Flow (gpm)
7000
6000
5000
4000
3000
2000
1000
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15

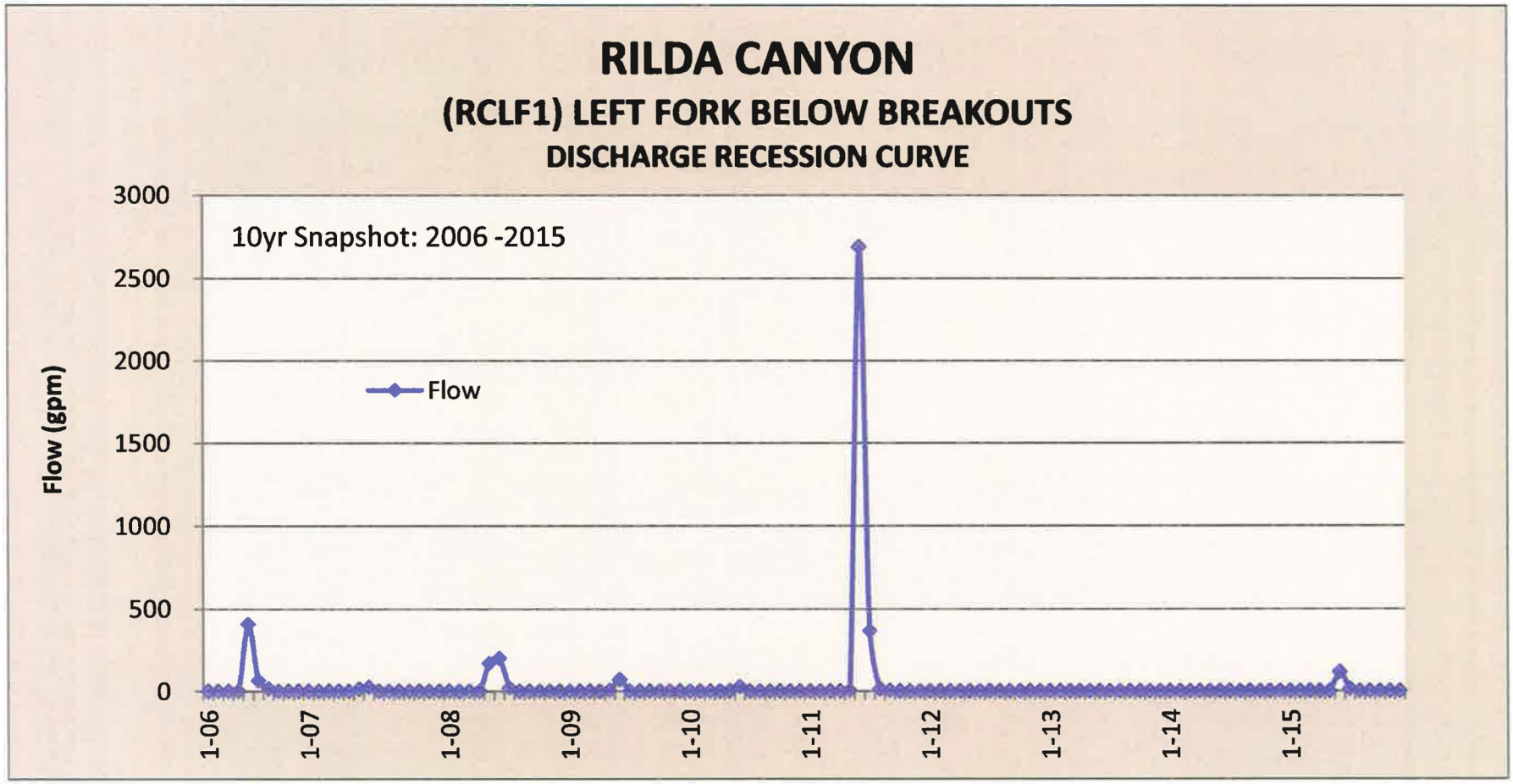

DEER CREEK
(DCR06) BELOW MINE
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
FLOW
Flow (gpm)
7000
6000
5000
4000
3000
2000
1000
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15

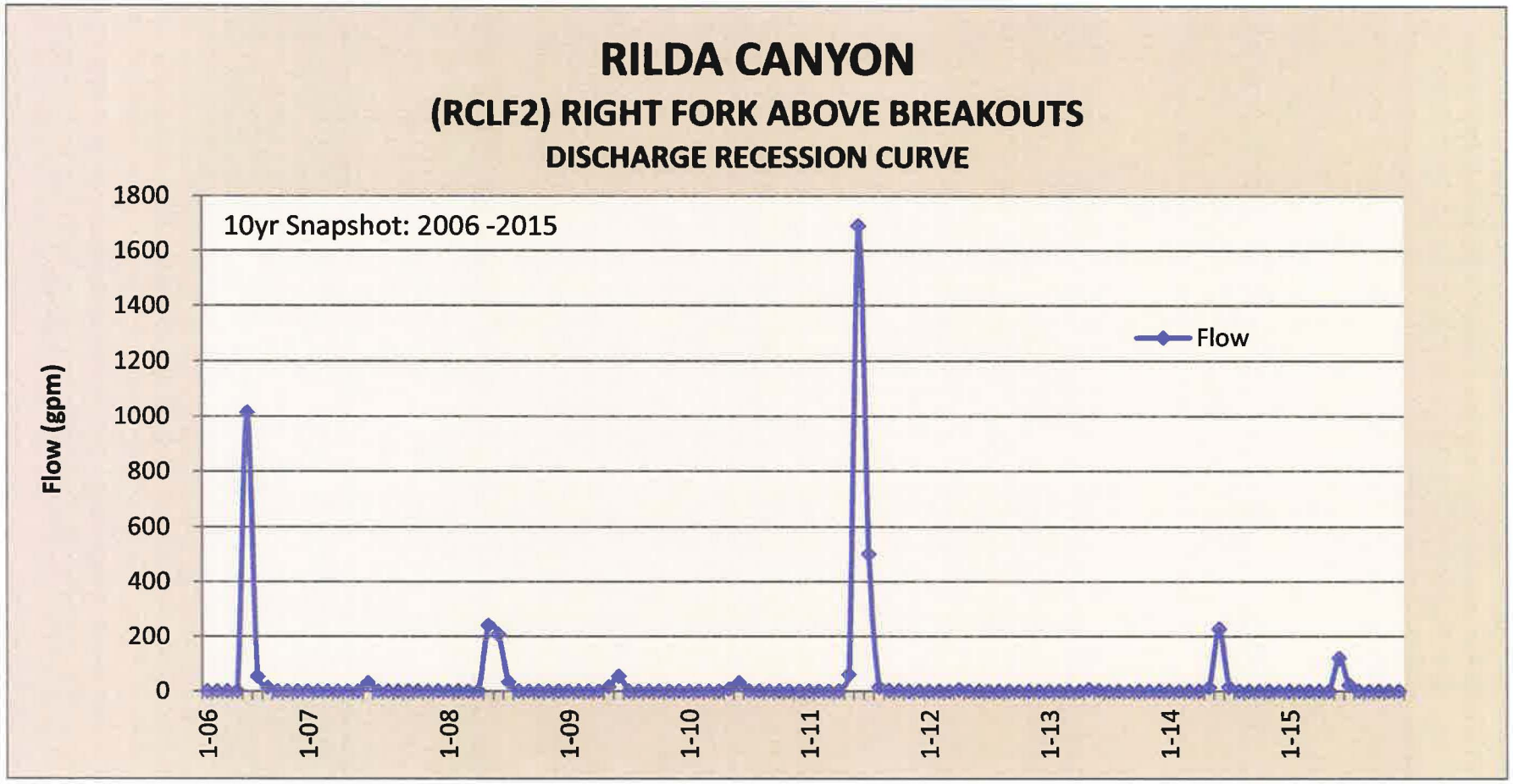

MEETINGHOUSE CANYON
(MHC01) LEFT FORK
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow
Flow (gpm)
3000
2500
2000
1500
1000
500
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15

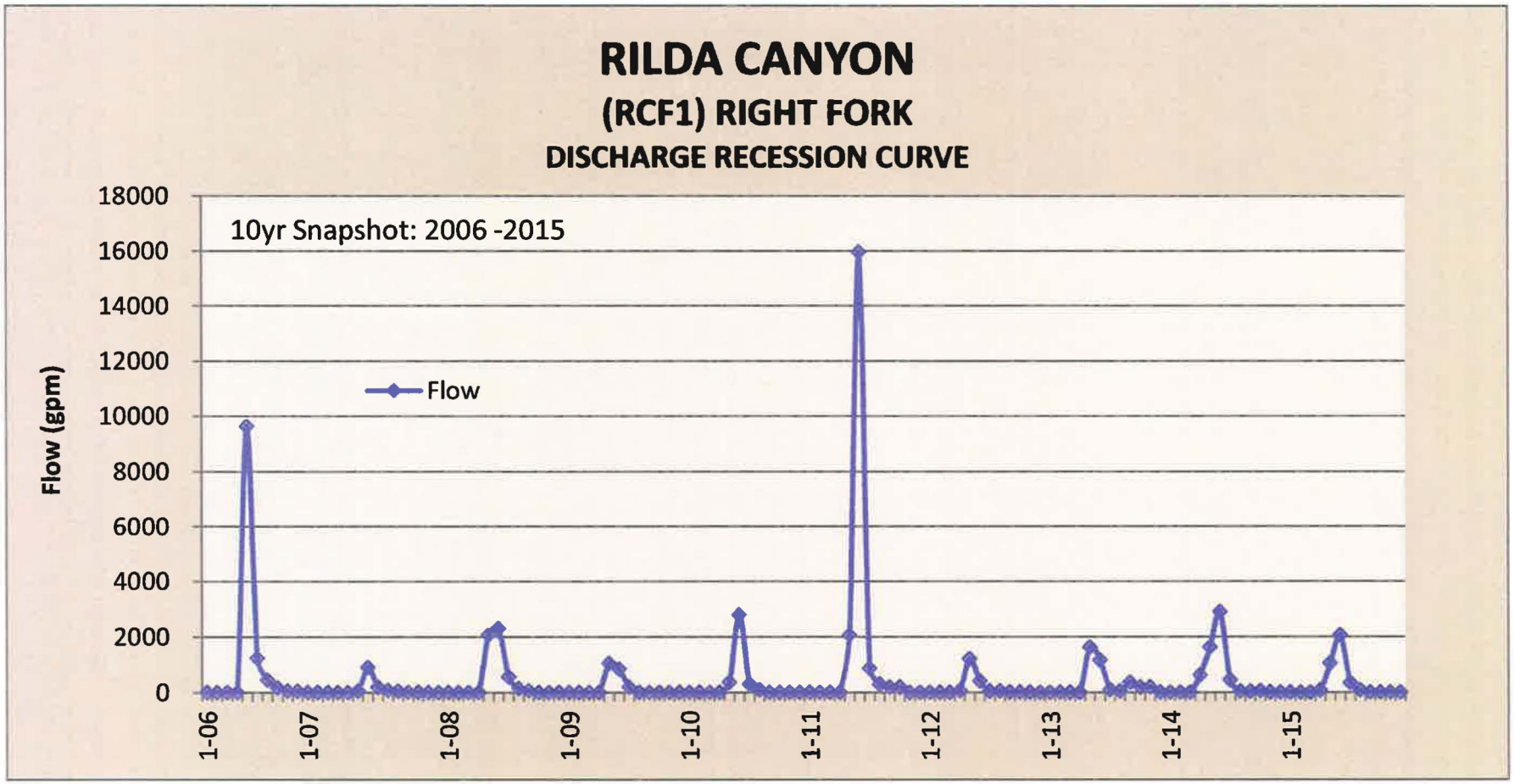

MILL FORK
(MFA1) ABOVE MINE
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow (gpm)
16000
14000
12000
10000
8000
6000
4000
2000
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15
Flow

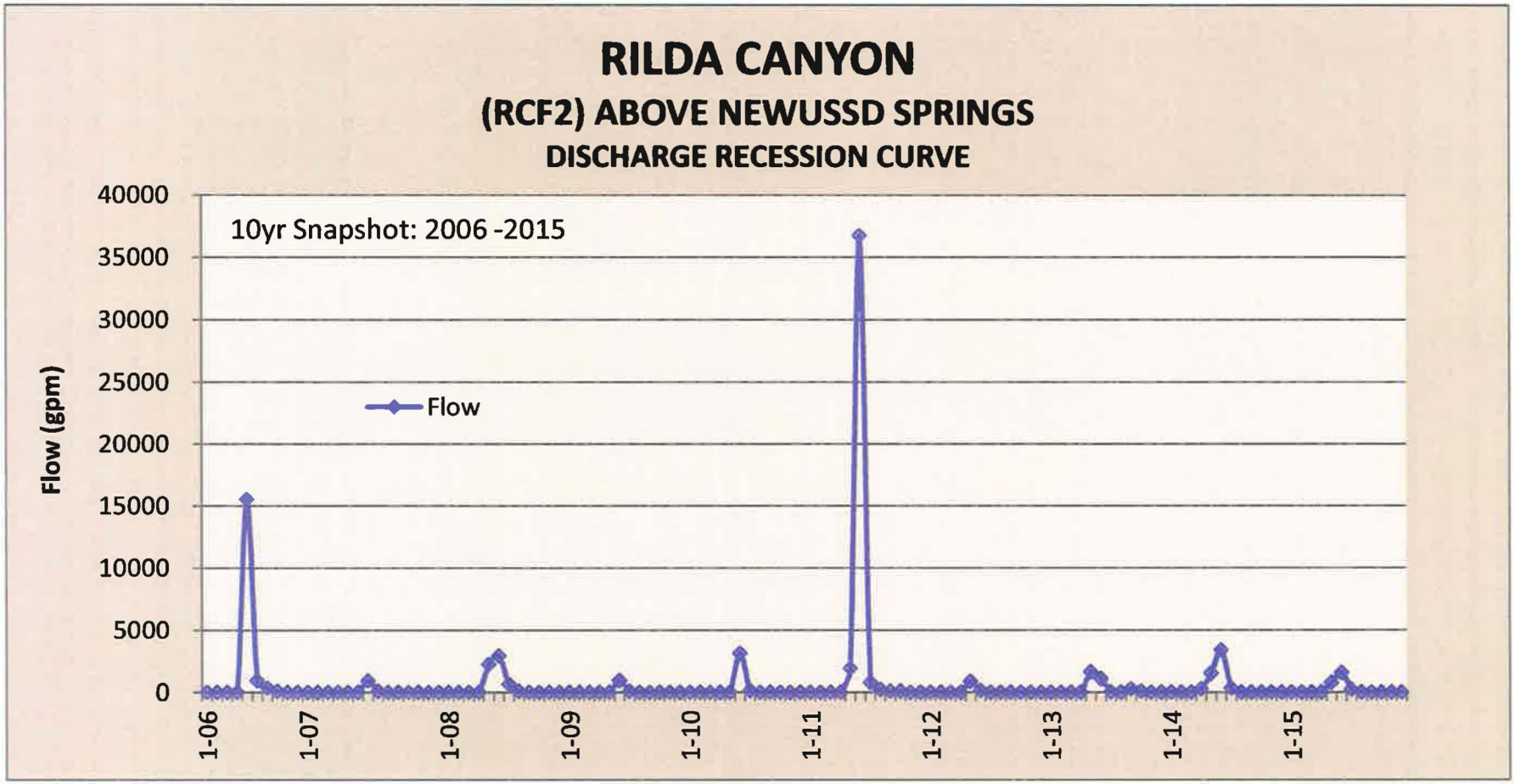

MILL FORK
(MFB2) BELOW MINE
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow
Flow (gpm)
14000
12000
10000
8000
6000
4000
2000
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15

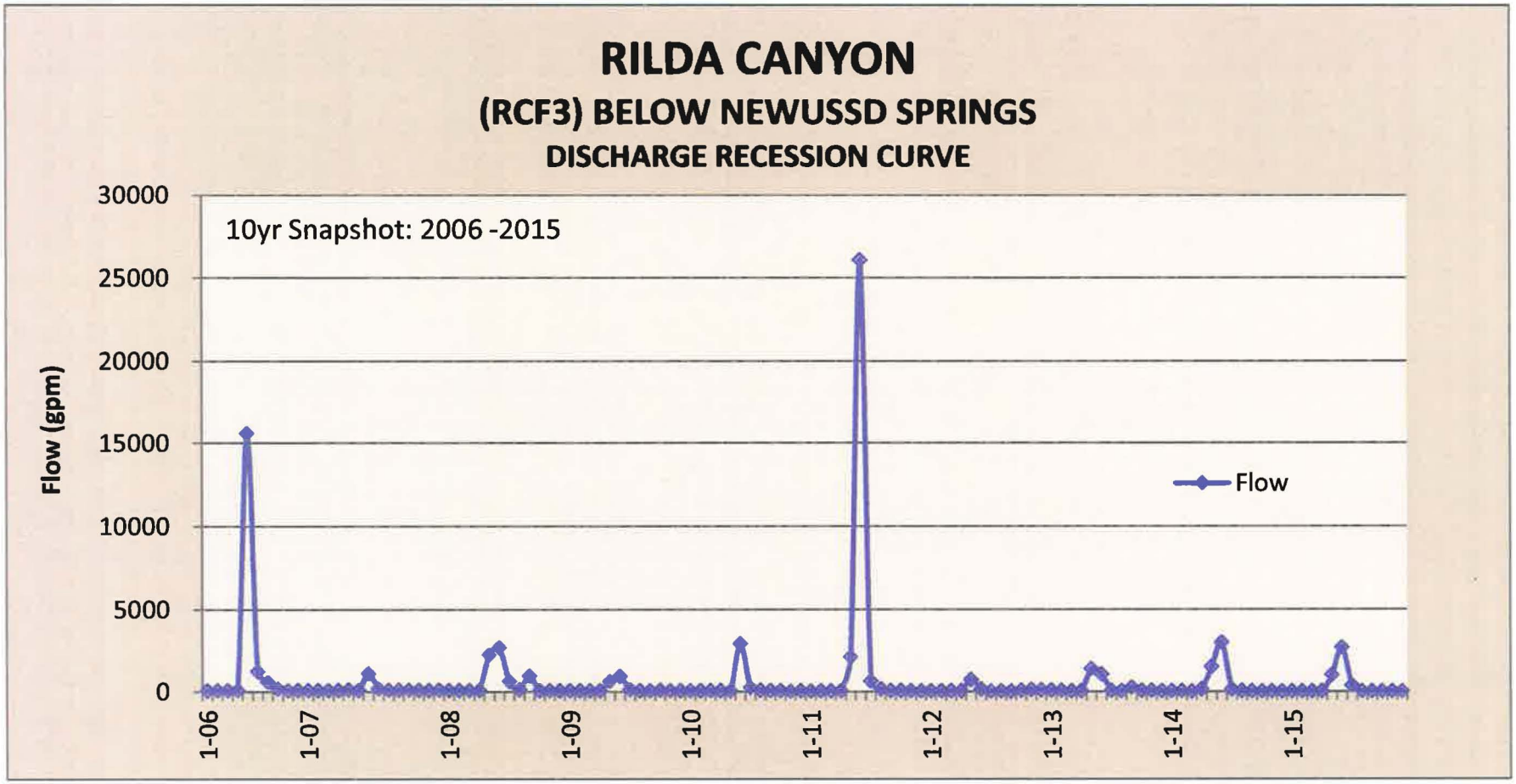

MILL FORK
(MFU03) ABOVE MILL FORK GRABEN
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow
Flow (gpm)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15

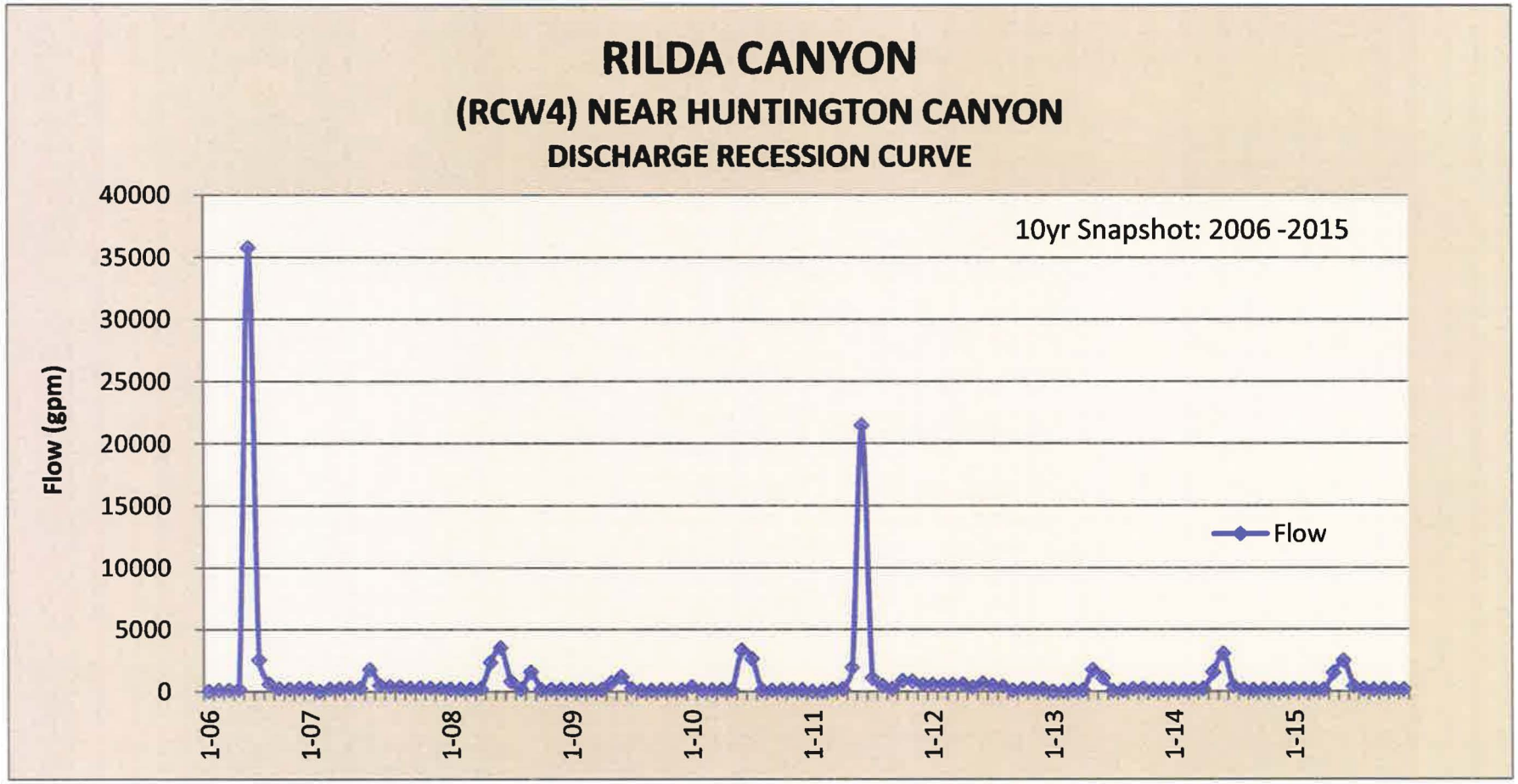

RILDA CANYON
(RCLF1) LEFT FORK BELOW BREAKOUTS
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow
Flow (gpm)
3000
2500
2000
1500
1000
500
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15

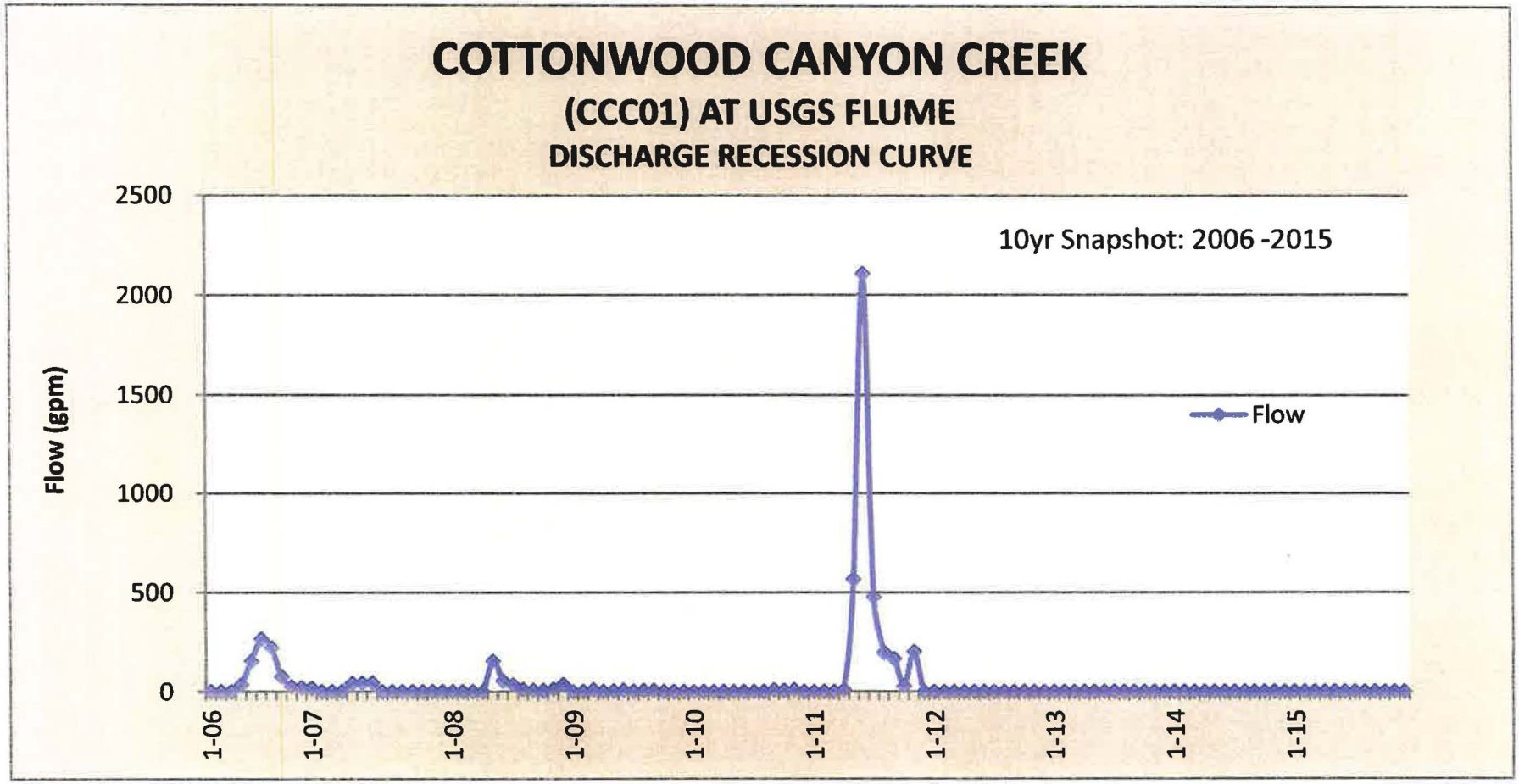

RILDA CANYON
(RCLF2) RIGHT FORK ABOVE BREAKOUTS
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow (gpm)
1800
1600
1400
1200
1000
800
600
400
200
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15
Flow

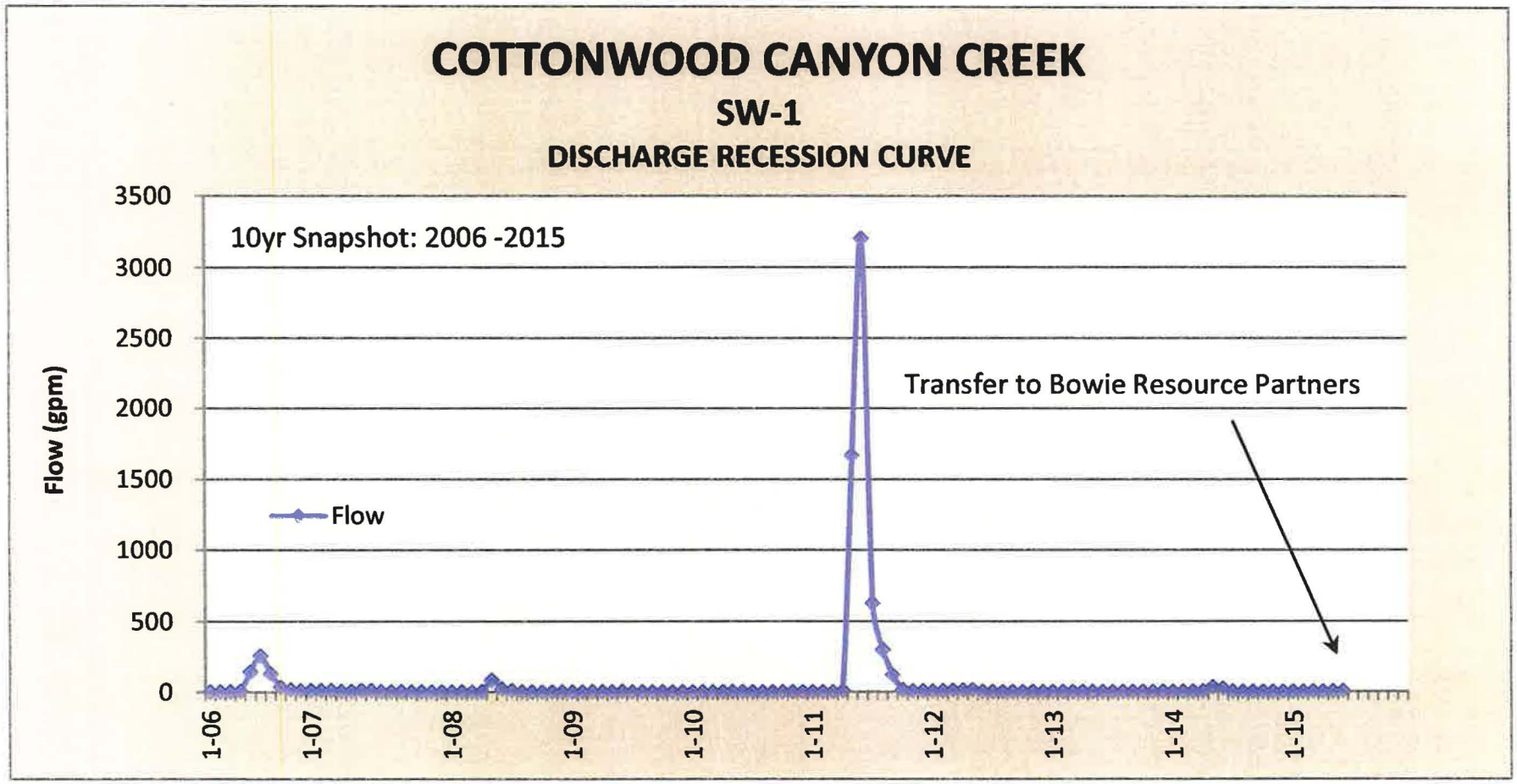

RILDA CANYON
(RCF1) RIGHT FORK
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow
Flow (gpm)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15

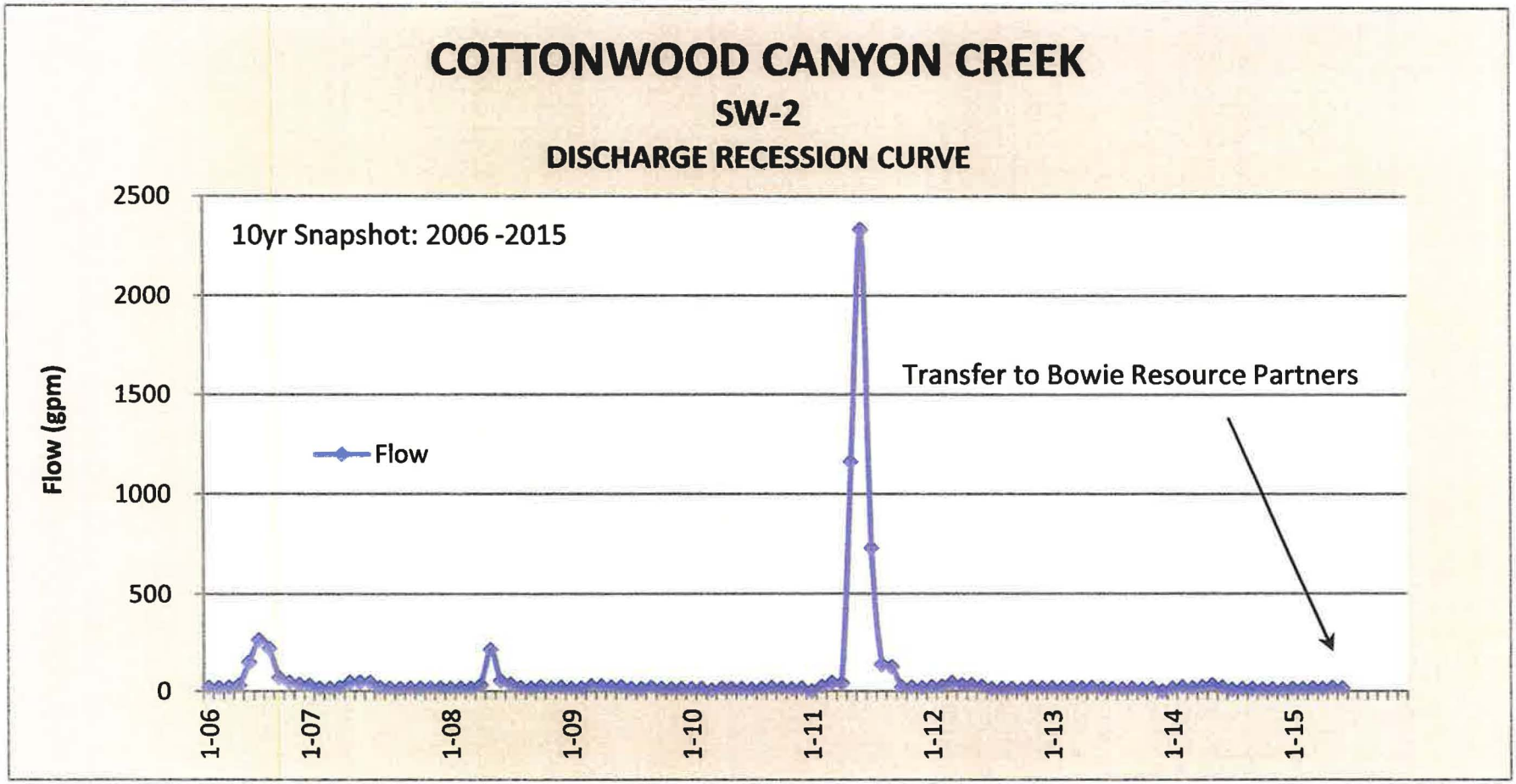

RILDA CANYON
(RCF2) ABOVE NEWUSSD SPRINGS
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow
Flow (gpm)
40000
35000
30000
25000
20000
15000
10000
5000
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15

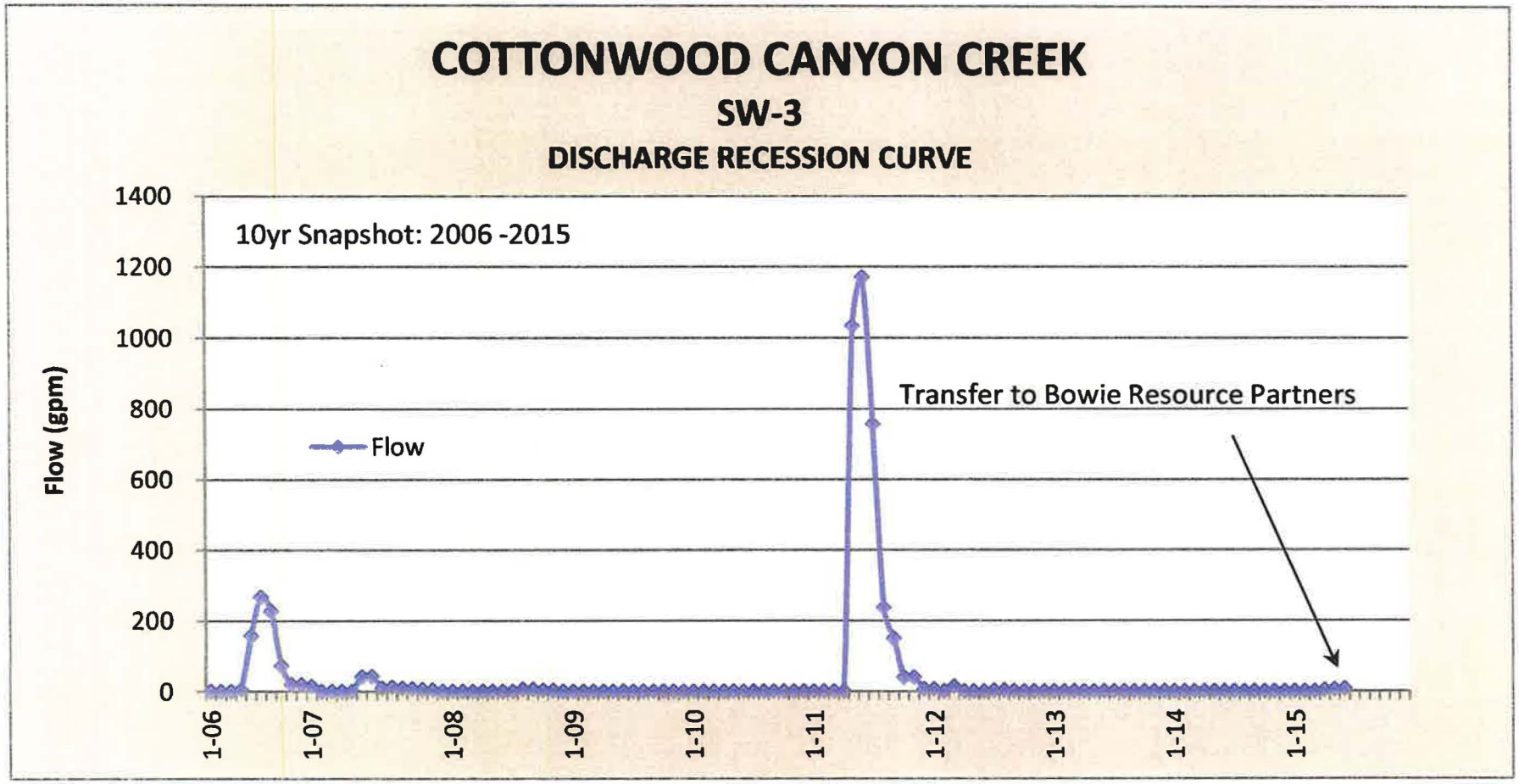

RILDA CANYON
(RCF3) BELOW NEWUSSD SPRINGS
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow (gpm)
30000
25000
20000
15000
10000
5000
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15
Flow


RILDA CANYON
(RCW4) NEAR HUNTINGTON CANYON
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow (gpm)
40000
35000
30000
25000
20000
15000
10000
5000
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15
Flow


COTTONWOOD CANYON CREEK
(CCC01) AT USGS FLUME
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow
Flow (gpm)
2500
2000
1500
1000
500
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15


COTTONWOOD CANYON CREEK
SW-1
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Transfer to Bowie Resource Partners
Flow
Flow (gpm)
3500
3000
2500
2000
1500
1000
500
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15


COTTONWOOD CANYON CREEK
SW-2
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Transfer to Bowie Resource Partners
Flow
Flow (gpm)
2500
2000
1500
1000
500
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15


COTTONWOOD CANYON CREEK
SW-3
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow
Transfer to Bowie Resource Partners
Flow (gpm)
1400
1200
1000
800
600
400
200
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15

INDIAN CREEK WATER QUALITY *

ICA

APPENDIX F

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20151102	0.0	257	71.9	0.0	2.0	493	9.5	273	0.00	0.00	22.77	0.00	0.0	8.22	0.82	3.54	13.0	0.0	300
2014**	0.0	267	69.2	0.0	2.0	509		259	0.13	0.00	20.83	0.00	0.0	8.28	0.75	2.51	11.0	0.0	295
2013** MEAN	0.0	246	73.9	0.0	2.0	501		278	0.06	0.00	22.70	0.00	0.0	8.36	0.76	2.99	10.0	8.0	267
2012** MEAN	0.0	253	73.5	0.0	2.0	490		281	0.00	0.00	23.68	0.00	0.0	8.26	0.70	3.16	9.0	0.0	273
2011** MEAN	0	274	77	0	2	507		277	0	0	21	0		8	1	3	6	7	295
2010** MEAN	0	264	72.59	0	3	512		270	0.21	0	21.56	0		8.19	1.05	3.26	12	0	313
2009** MEAN	5	262	72.65		2	511		278	0.09		23.39			8.22	1.05	3.32	11	0	277
2008** MEAN		257	74.26		2	499		280	0.12		22.97	0.002		8.3	0.89	3.27	10	0	286
2007** MEAN		251	72.0		2	496		274	0.30		22.8	0.02		8.02	1.07	3.01	14	26	294
2006** MEAN		297	77.5		3	554		282	0.06		21.5	0.01		7.96	0.64	2.71	8		282
2005** MEAN		265	80.8		3	571		294	0.07		23	0		8.30	1.56	3.27	8	5	291
2004** MEAN		262	77.4		2	493		281	0.08		21.4	0.03		8.06	0.79	2.92	13	7	299
2003** MEAN		312	71.5		2	493		271	0.02		22.4			8.24	0.91	2.93	19		265
2002** MEAN		286	67.0		2	483		258			22.0			8.25		4.00	23		304
2001** MEAN		327	71.0		3	633		264	0.20		21.0			8.21		3.00	9		289
2000** MEAN		313	69.0		2	487		255	0.20		20.0			8.10		3.00	10	43	274
HISTORICAL 2000-2014																			
MIN	0	246.0	67.0	0.0	2	483		255.00	0.00	0.0	20.00	0.0	0.00	7.96	0.64	2.5	6.0	0	265
MAX	5	327.0	80.8	0.0	3	633		294.00	0.30	0.0	23.68	0.0	0.00	8.36	1.56	4.0	23.0	43	313
MEAN	1	275.7	73.3	0.0	2	516		273.47	0.12	0.0	21.95	0.0	0.00	8.20	0.94	3.1	11.5	8.73	286.93

INDIAN CREEK WATER QUALITY *

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APPENDIX F

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20151102	0.0	234.0	60.4	0.0	2.0	453.0	9.6	245.0	0.1	0.0	23.0	0.0	0.0	8.3	0.8	4.2	13.0	0.0	267.0
2014**	0	241	61	0	2	475		239	0	0	21	0	0	8	1	3	12	20	272
2013** MEAN	0	217	57	0	2	438		233	0	0	22	0	0	8	1	4	10	0	232
2012** MEAN	0	226	60	0	2	436		247	0	0	24	0	0	8	1	4	10	11	207
2011** MEAN	0	251	68	0	2	484		259	0	0	21	0		8	1	5	11	9	271
2010** MEAN	0	240	63.17	0	3	457		246	0.32	0	21.48	0	0	8.32	1.08	4.37	13	25	288
2009** MEAN	0	246	68		2	480		267	0.41		24	0.000		8.35	1.1	4.34	13	14	261
2008** MEAN	7	236	66	0	2	465		259	0.25		23	0.006		8.27	0.9	3.99	11	0	276
2007** MEAN		237	64.9		2.0	466		258	1.43		23	0.046		8.09	1.01	3.73	14.0	37	286
2006** MEAN		239	72.0		3.0	527		268	0.24		22	0.005		8.25	0.61	3.62	9.0		278
2005** MEAN		238	68.2	5	2.0	534		258	0.20		21	0.013		8.41	1.00	4.29	10.0	9	268
2004** MEAN		258	73.4		2.0	490		271	0.72		21	0.025		7.94	0.75	3.29	12.0	10	284
2003** MEAN		276	59.3		2.0	427		236	0.37		21			8.13	0.93	3.41	11.0	21	216
2002** MEAN		282	57.0		2.0	432		233	0.40		22			8.21		4.00	8.0		235
2001** MEAN		293	59.0		2.4	559		234	0.20		21			8.26		3.00	7.7	6	253
2000** MEAN	12	301	65.0		2.0	468		245	0.10		20			8.19	1.00	3.00	9.0	9	266
HISTORICAL 2000-2014																			
MIN	0.00	217.00	57.00	0.00	2.00	427.00		233.00	0.10	0.00	20.00	0.00	0.00	7.94	0.61	3.00	7.70	0.00	207.00
MAX	12.00	301.00	73.40	5.00	3.00	559.00		271.00	1.43	0.00	23.85	0.02	0.00	8.44	1.08	5.38	14.00	37.00	288.00
MEAN	2.38	252.07	64.12	0.63	2.16	475.87		250.20	0.40	0.00	21.87	0.01	0.00	8.26	0.90	3.80	10.71	13.15	259.53

INDIAN CREEK WATER QUALITY *

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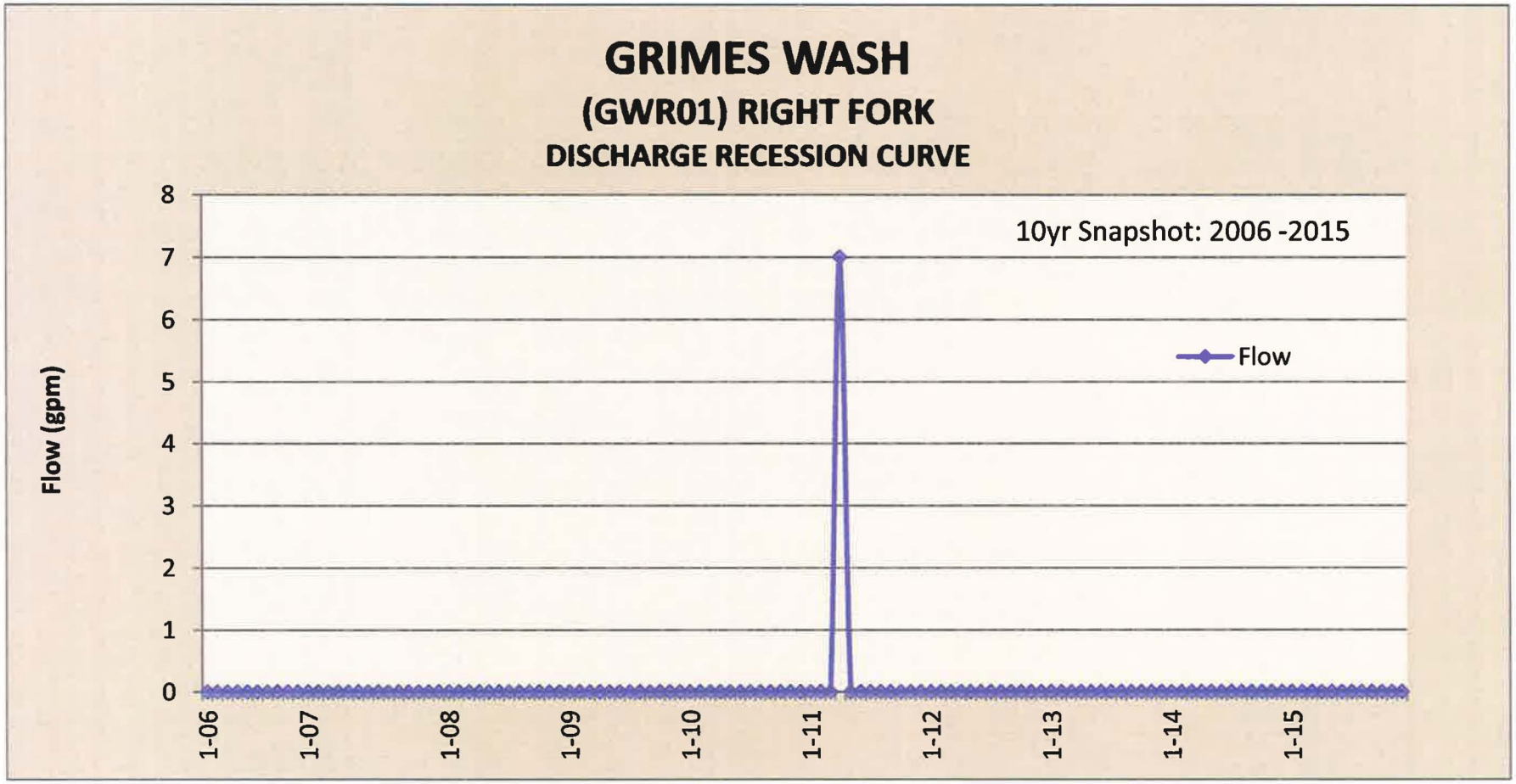
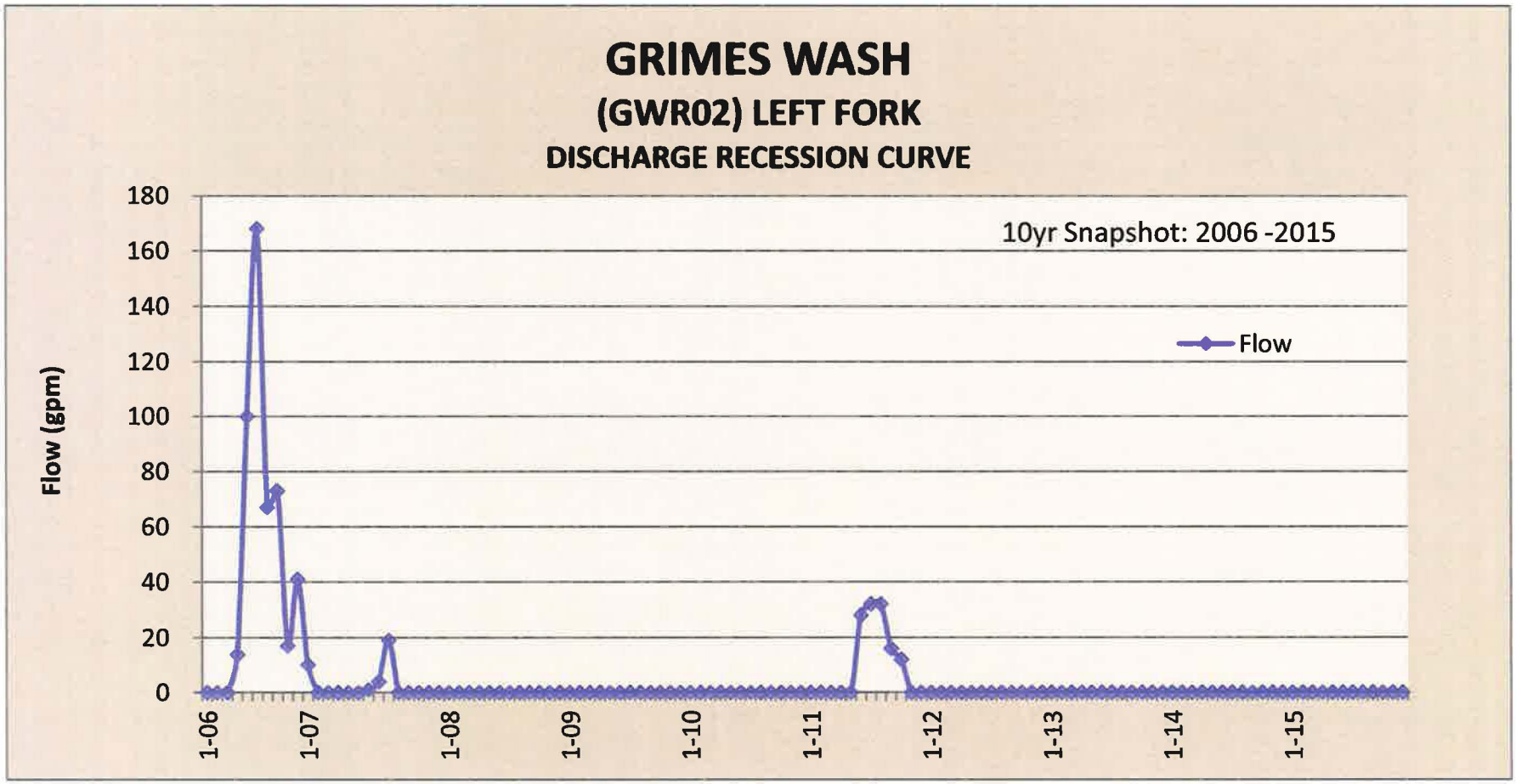
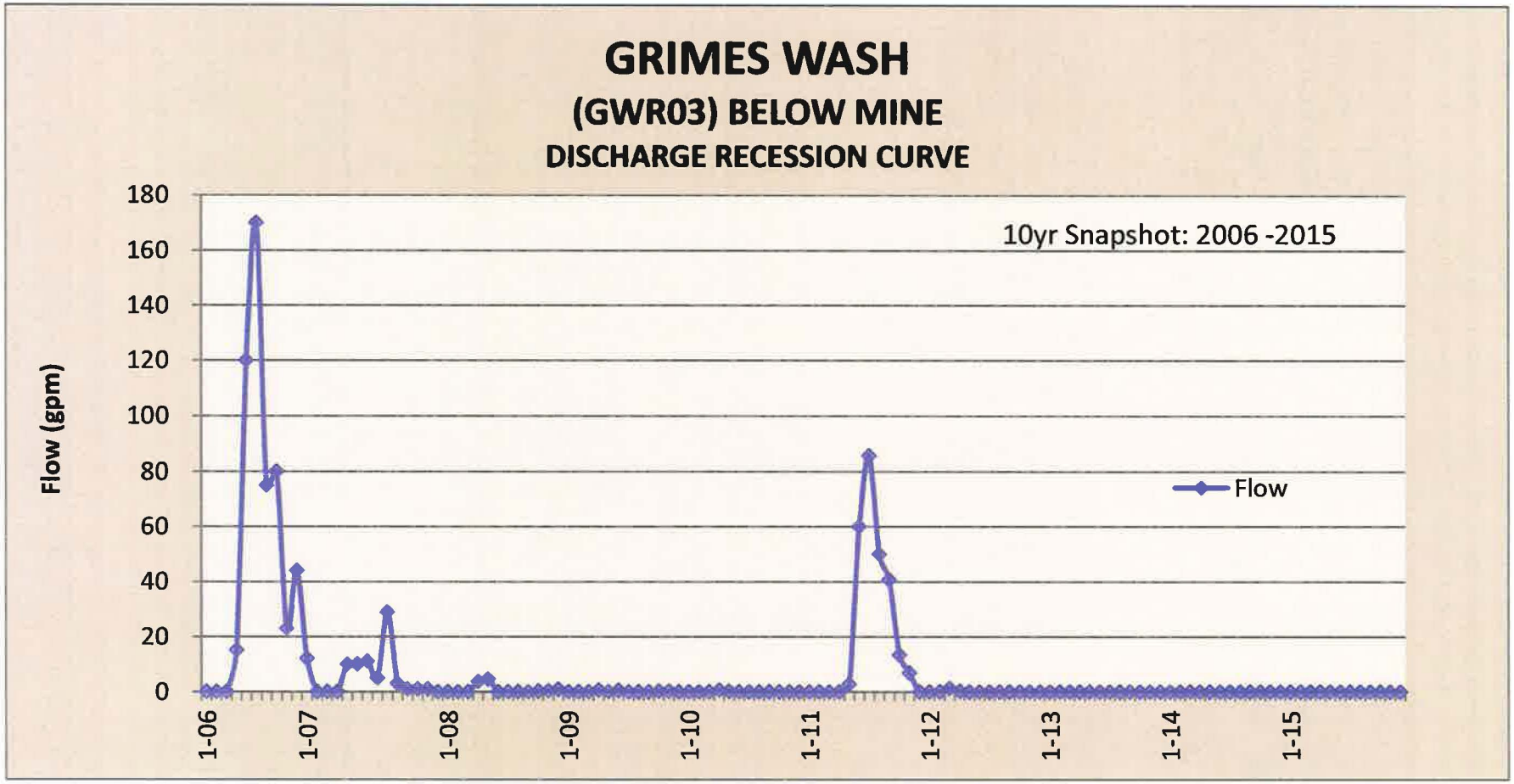
APPENDIX F

2015** SAMPLE DATES	ACIDITY	ALKALINITY BICARBONATE	CALCIUM	CARBONATE	CHLORIDE	CONDUCTIVITY (umhos/cm)	DISSOLVED OXYGEN	HARDNESS	IRON TOTAL	IRON DISSOLVED	MAGNESIUM	MANGANESE	OIL & GREASE	PH (units)	POTASSIUM	SODIUM	SULFATE	TSS	TDS
20151102	0	275	97.62	0	4	696	9.4	384	0.1	0	34.14	0.023	0	8.1	1.01	10.58	115	0	477
2014**	0	256	81.19	0	4	653		333	0.06	0	31.56	0.004	0	8.35	1.04	9.23	98	6	413
2013**																			
MEAN	0	276	98.76	0	4	727		391	0.17	0	35.14	0.006	0	8.34	0.96	10.68	119	0	460
2012**																			
MEAN																			
2011**																			
MEAN	0	324	95.37	0	5	670		370	0.06	0	31.99	0.005		8.33	1.58	11.38	47	0	414
2010**																			
MEAN	0	273	93.72	0	5	671		365	0.28	0	31.72	0	0	8.3	1.11	10.72	108	10	456
2009**																			
MEAN	9	269	89.02	0	4	662		363	0.21	0	34.29	0.007	0	8.19	1.51	10.11	87	8	407
2008**																			
MEAN		279	85.77		4	628		350	0.06		33.04	0.005	0	9.43	1.19	10.15	66	0	395
2007**																			
MEAN		256	96.8	6.0	4.0	717		388	0.12		35.60	0.02		8.17	1.39	10.30	130.0		484
2006**																			
MEAN		361	108.0		7	813	9	413	0.14		35	0.06	4.00	8.04	2.45	11.20	47	7	450
2005**																			
MEAN		361	108.0		7	813	9	413	0.14		35	0.06	4.00	8.04	2.45	11.20	47	7	450
No Flow During 2004																			
2003**																			
MEAN		307	81.5		3	624		329	0.13		30	0.009		8.21	1.05	8.87	108		367
2002**																			
MEAN		266	96.0		3	740		384	0.30		35			8.28		10.00	188		528
2001**																			
MEAN		379	80.0		4	753		323	0.10		30			8.29		10.00	43	10	369
2000**																			
MEAN		321	92.0		5	689		362			32			8.00	1.00	10.00	125		459
HISTORICAL 2000-2014																			
MIN	0	256.0	80.0	0.0	3	624	0	323.00	0.06	0	30.00	0.000	0.00	8.00	0.96	8.86	23.0	0	367
MAX	9	379.0	108.0	6.0	7	813	0	413.00	0.38	0.0	36.15	0.054	4.00	9.43	2.45	11.4	188.0	10	528
MEAN	1	299.71	91.69	0.8	4.36	696	0	365.00	0.16	0.0	33.06	0.016	0.57	8.30	1.29	10.19	90.07	4.56	426.36

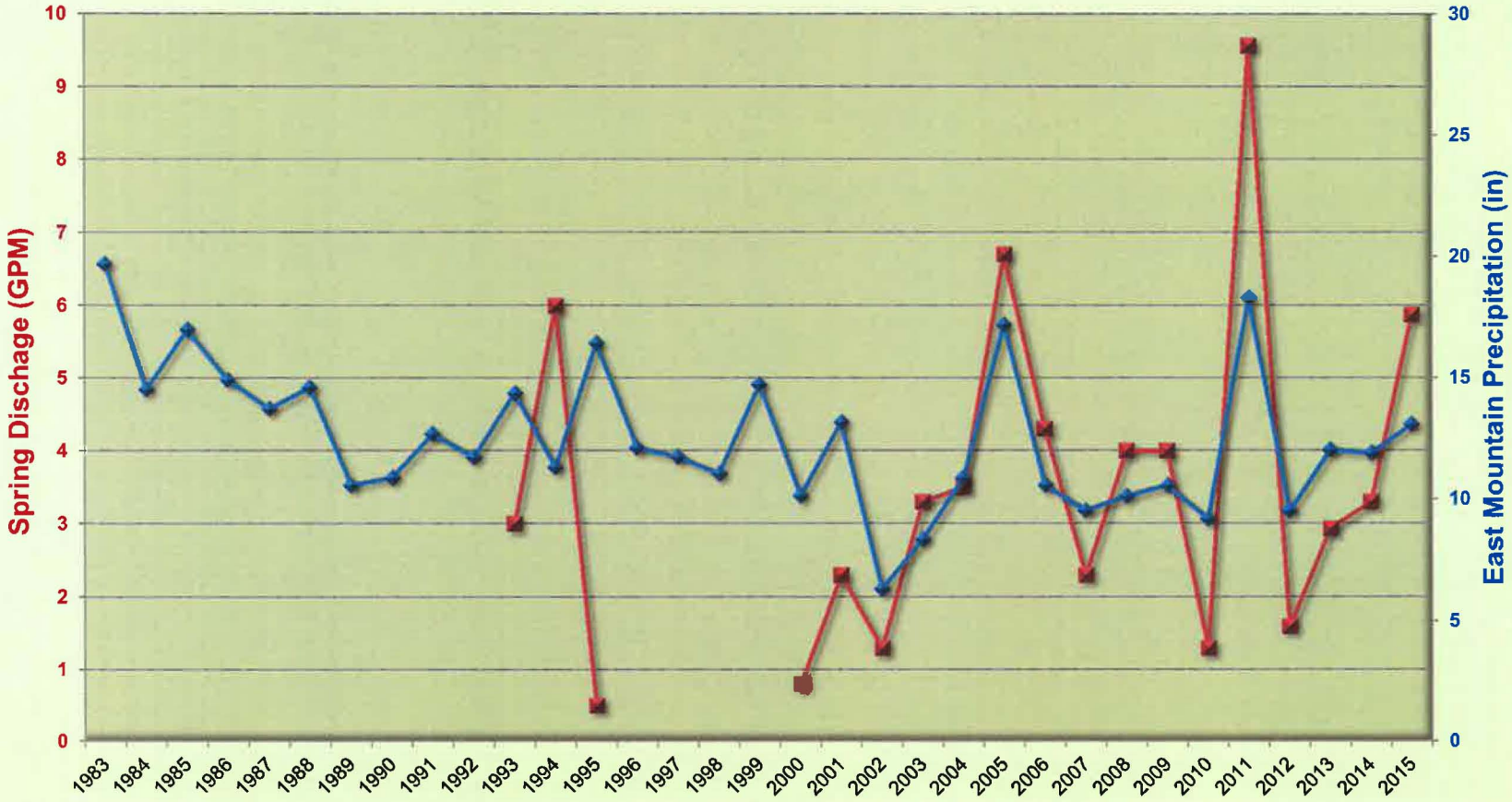

GRIMES WASH
(GWR01) RIGHT FORK
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow
Flow (gpm)
8
7
6
5
4
3
2
1
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15


GRIMES WASH
(GWR02) LEFT FORK
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow
Flow (gpm)
180
160
140
120
100
80
60
40
20
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15


GRIMES WASH
(GWR03) BELOW MINE
DISCHARGE RECESSION CURVE
10yr Snapshot: 2006 -2015
Flow (gpm)
180
160
140
120
100
80
60
40
20
0
1-06
1-07
1-08
1-09
1-10
1-11
1-12
1-13
1-14
1-15
Flow

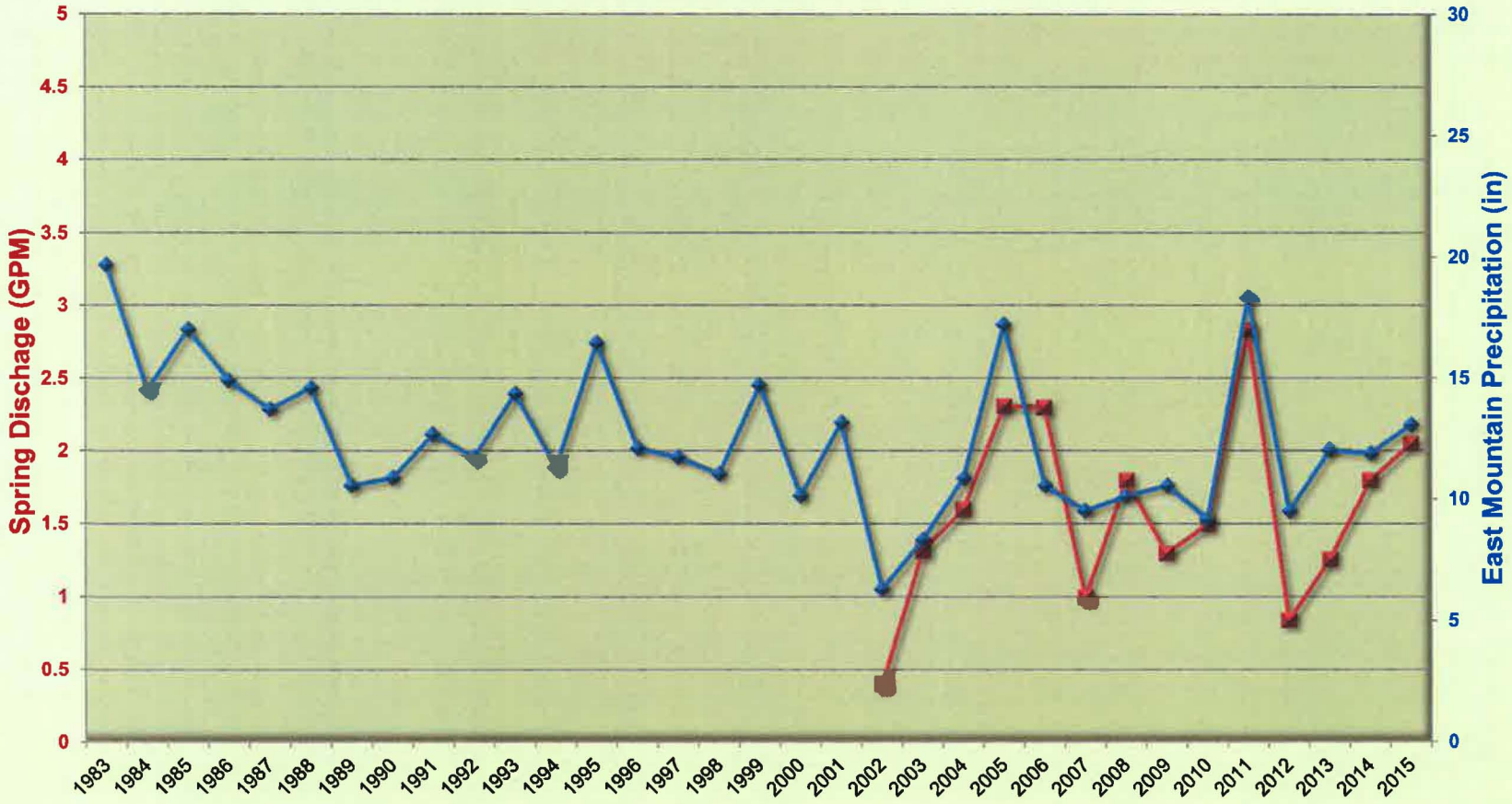
East Mountain Springs Northern Area

EAST MOUNTAIN SPRINGS
SPRING: EMPOND vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



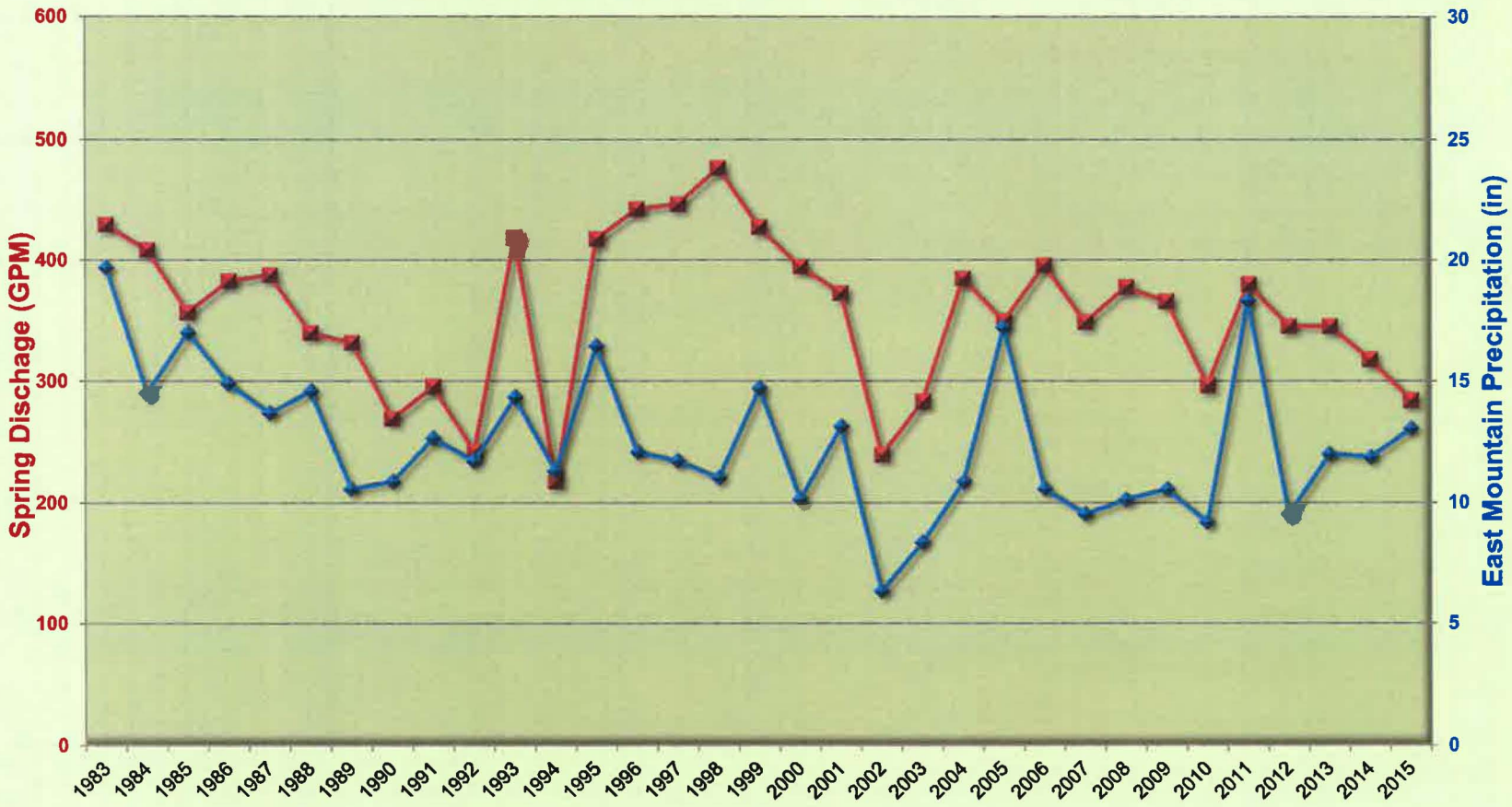
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: GRANT'S SPRING vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



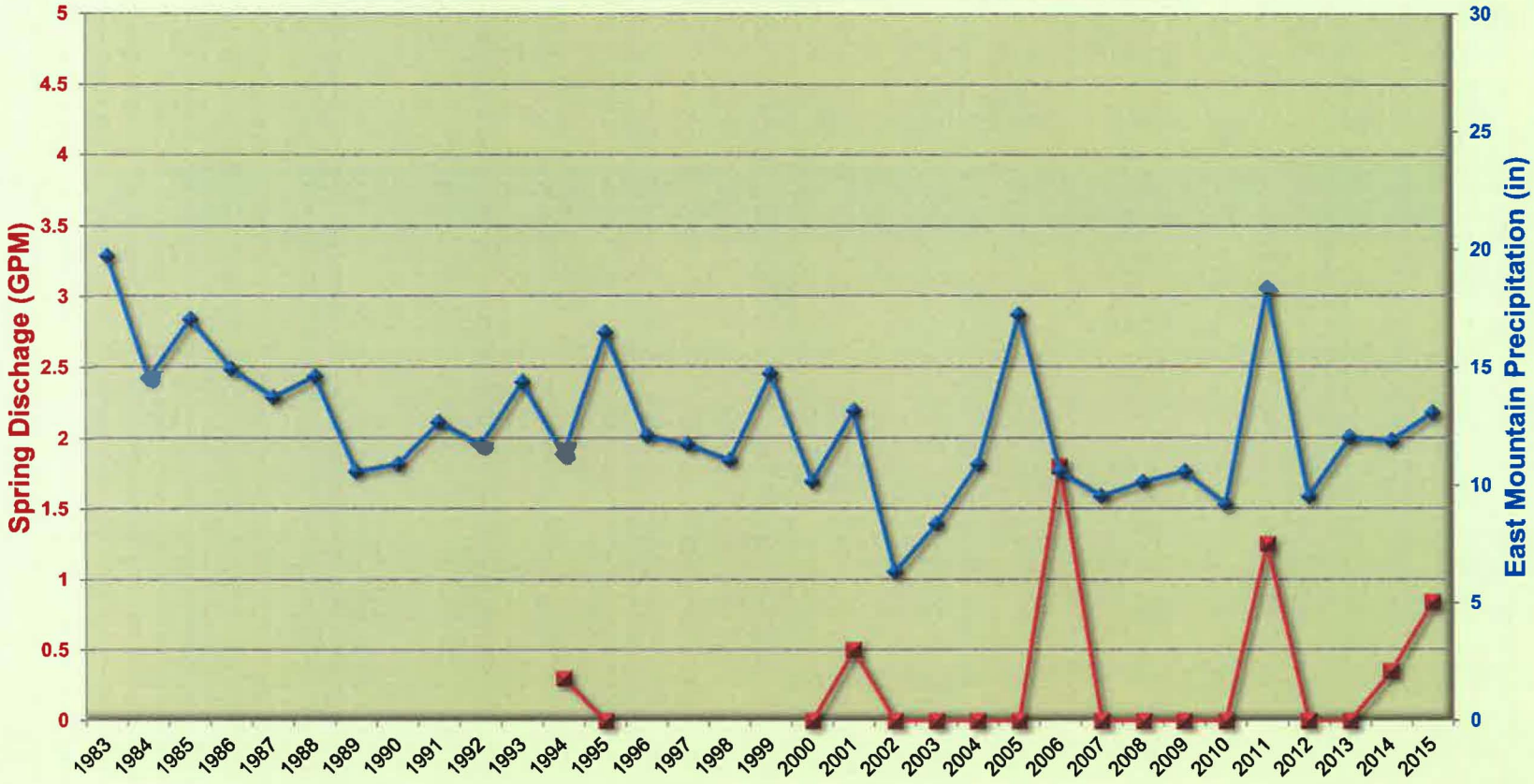
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: LITTLE BEAR vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



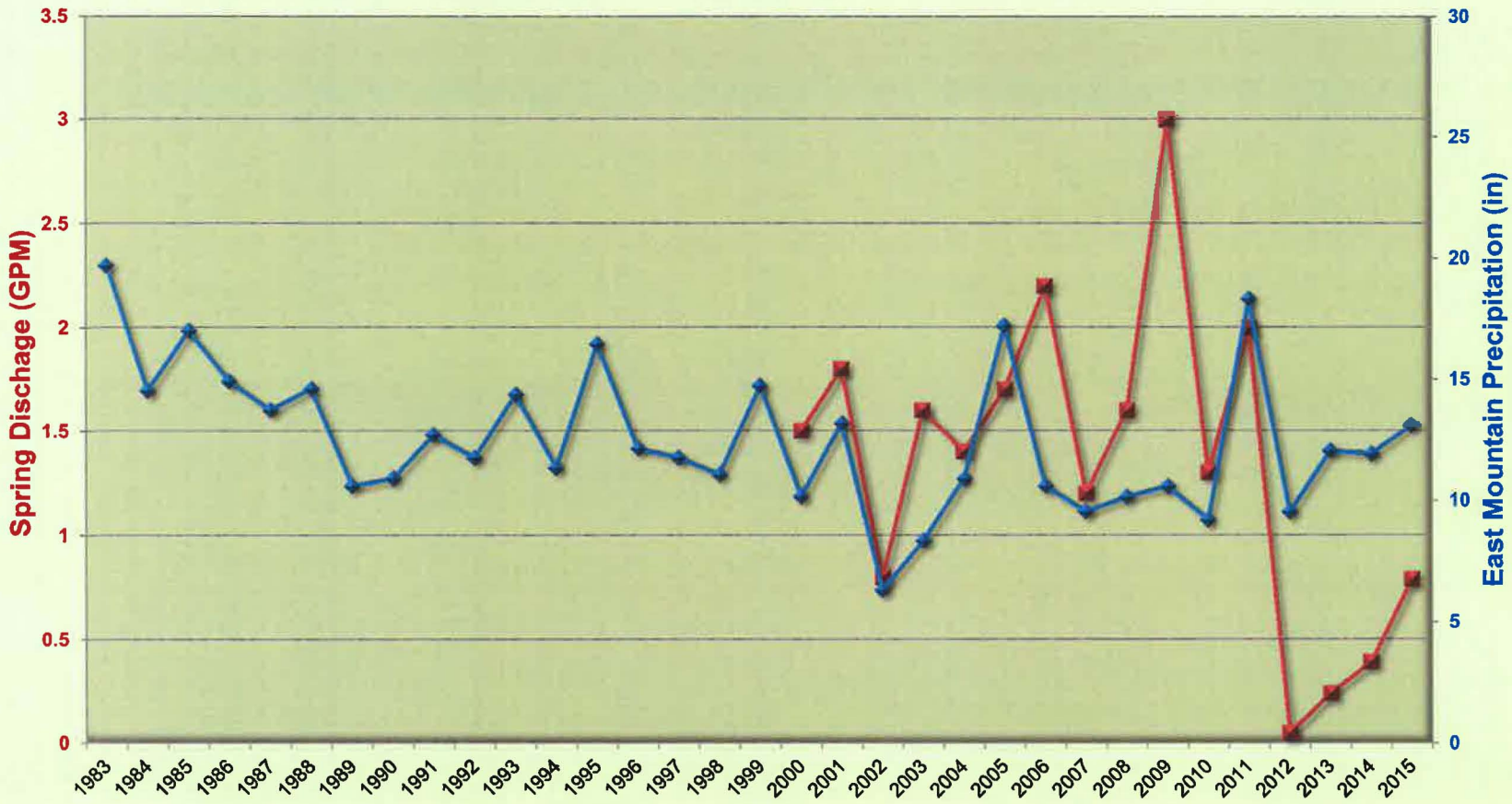
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: EM-216 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



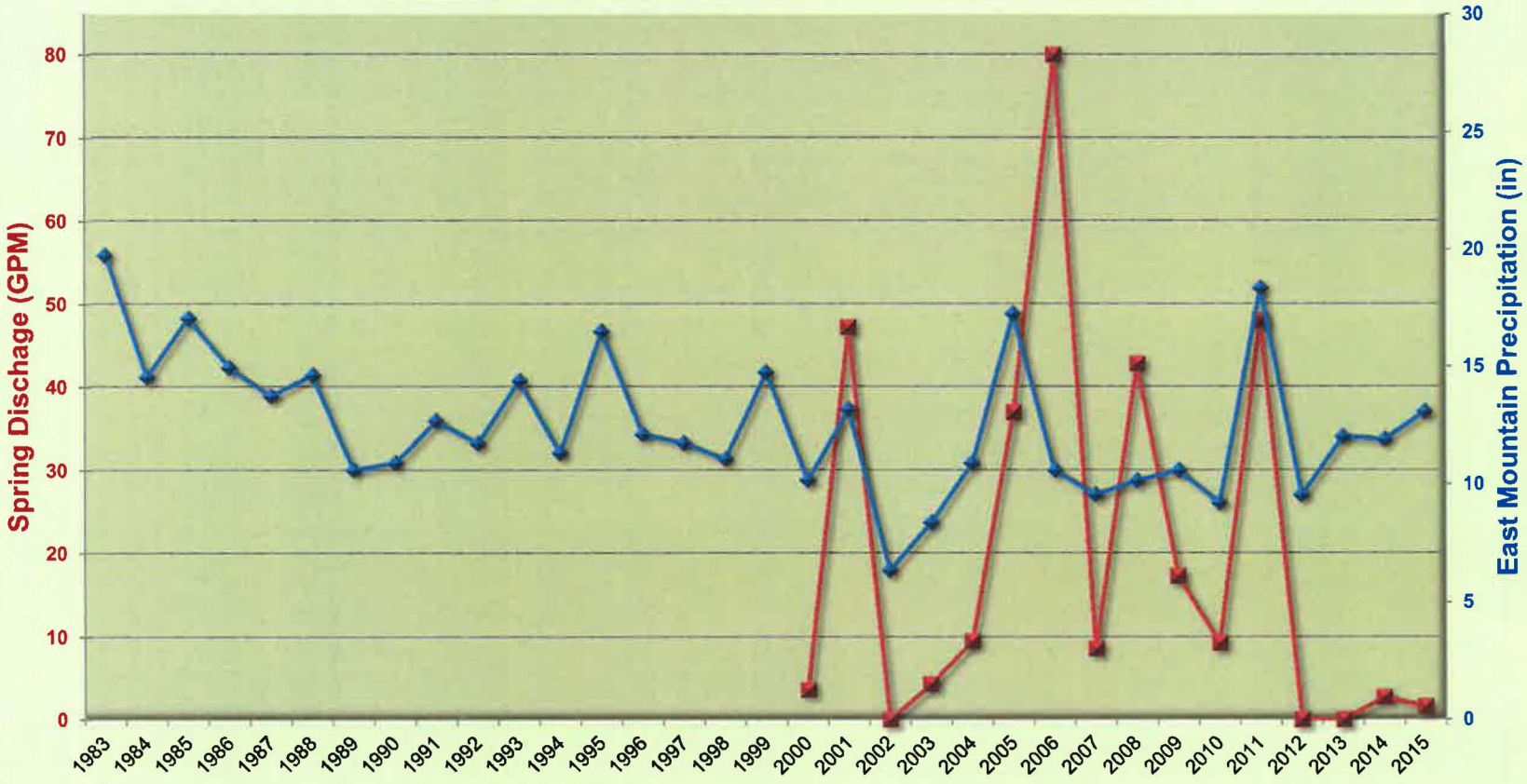
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: JV-9 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



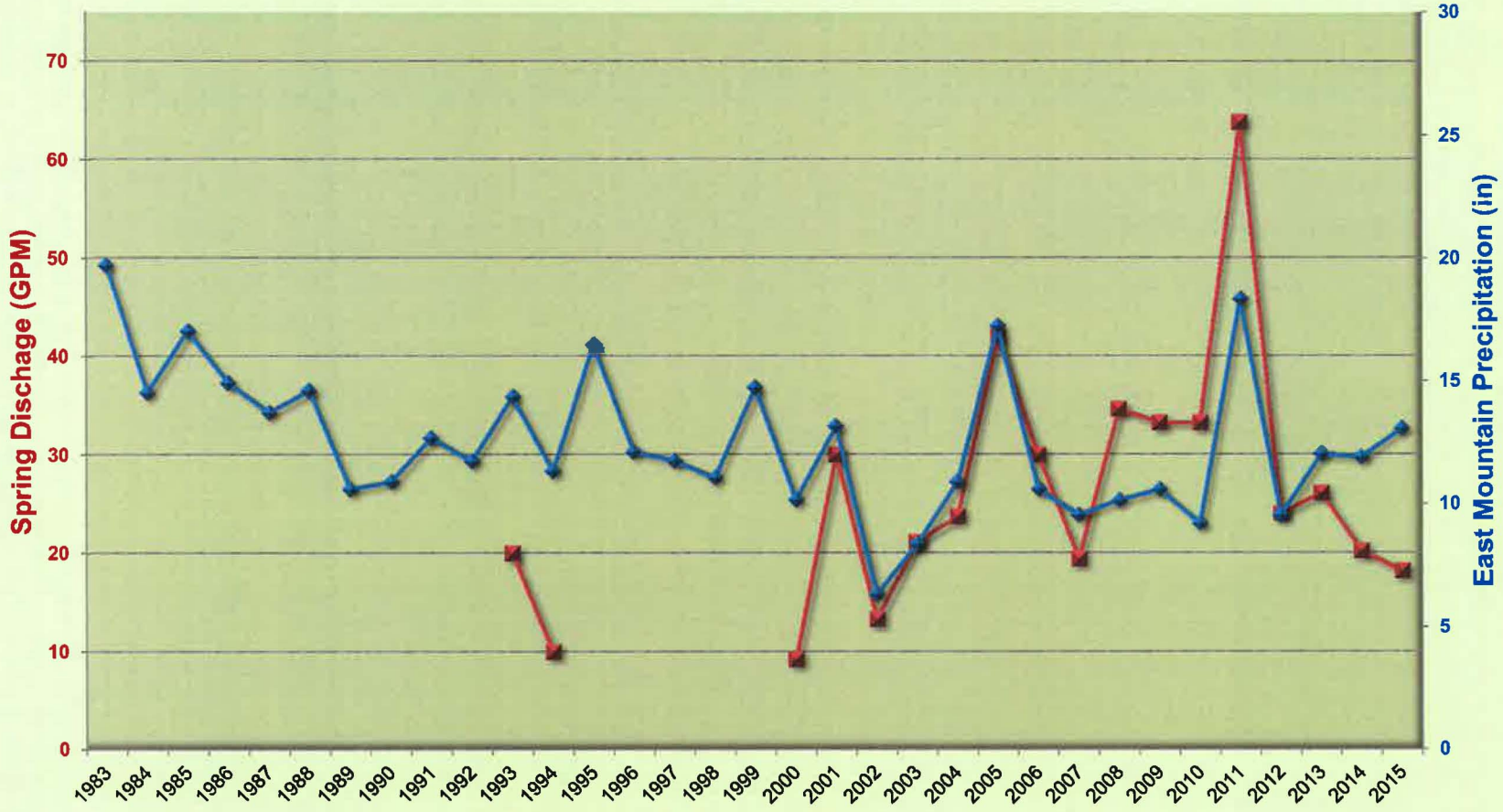
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: JV-34 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



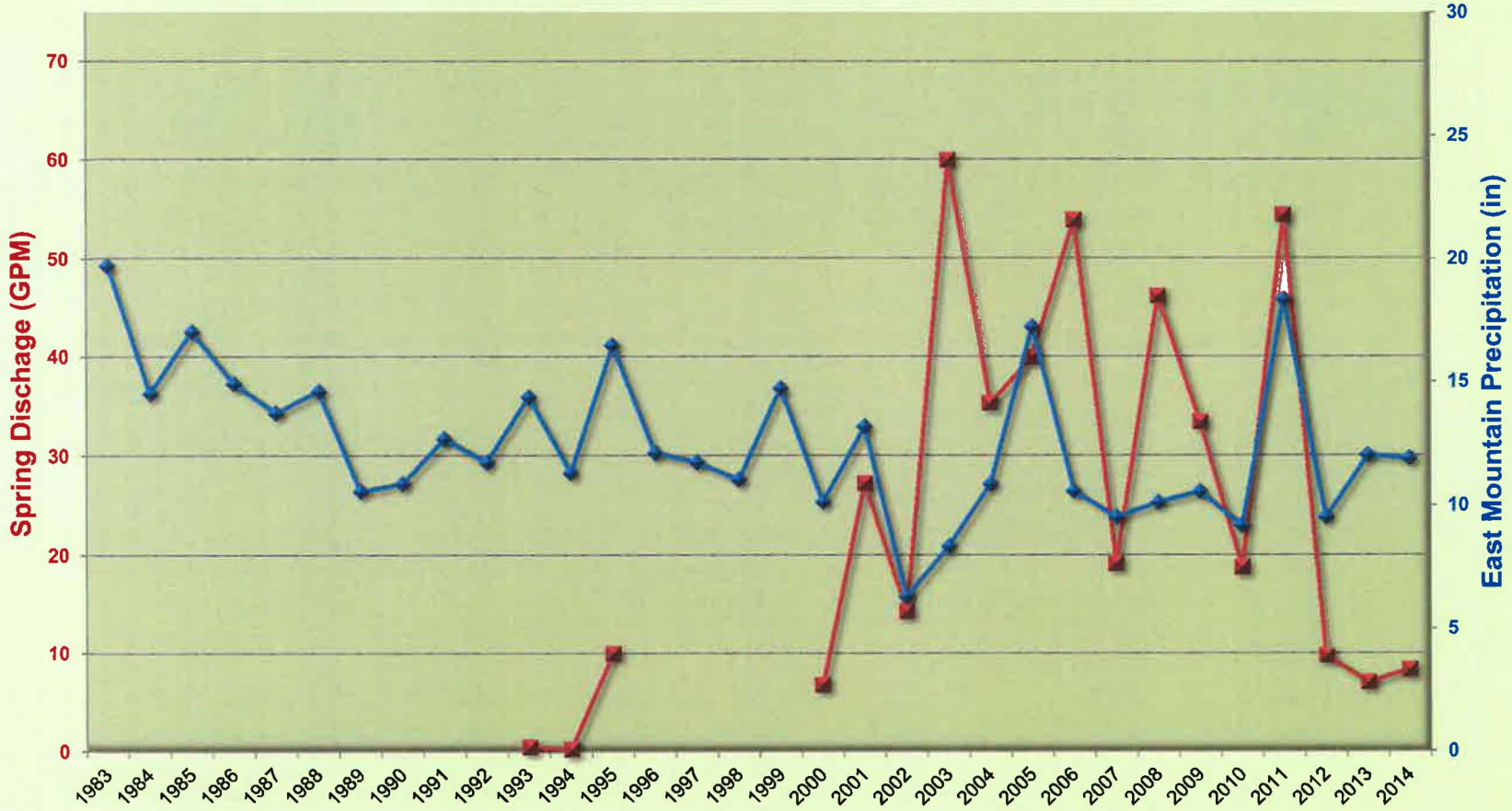
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: MF-7 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



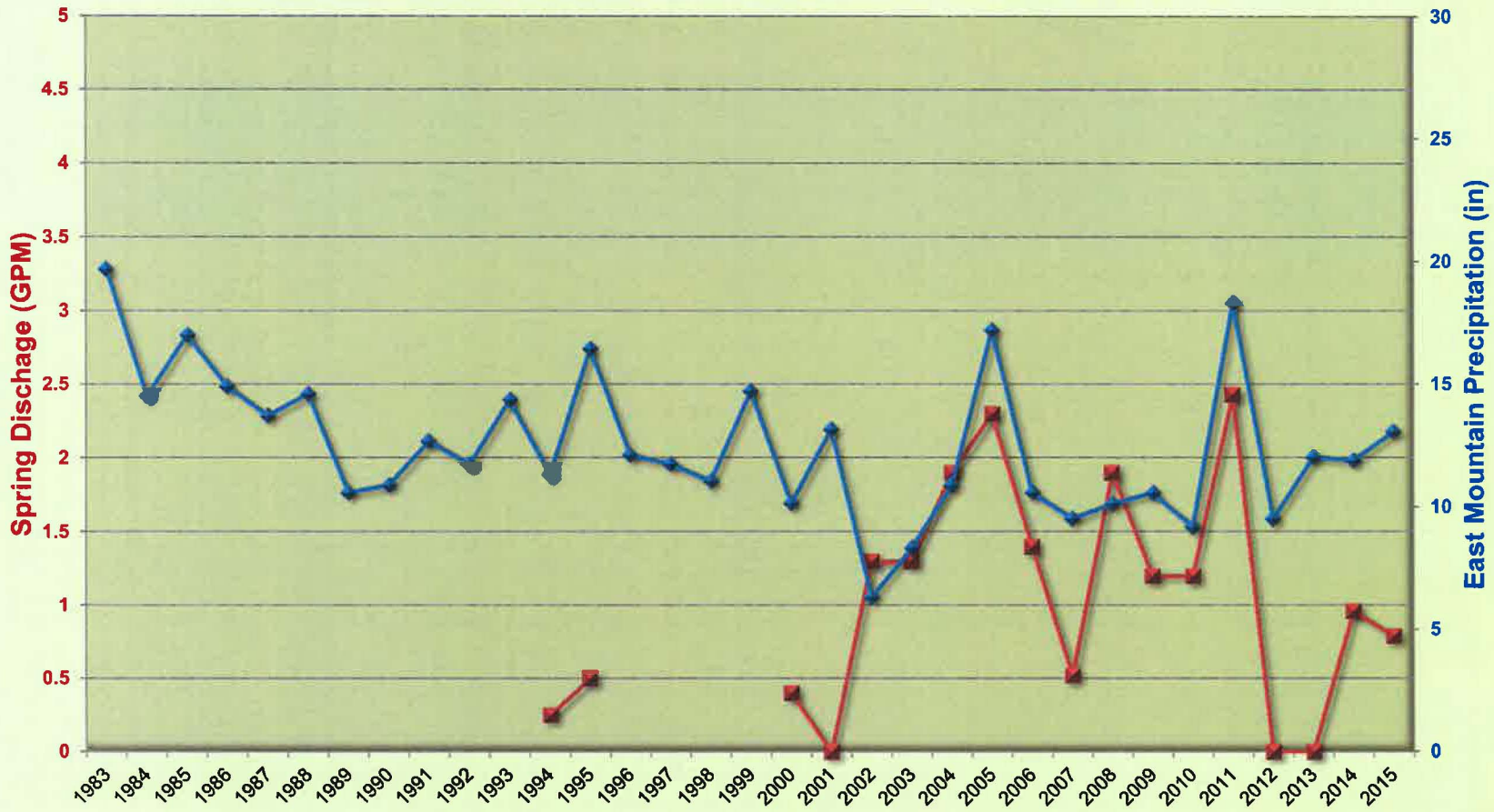
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: MF-10 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



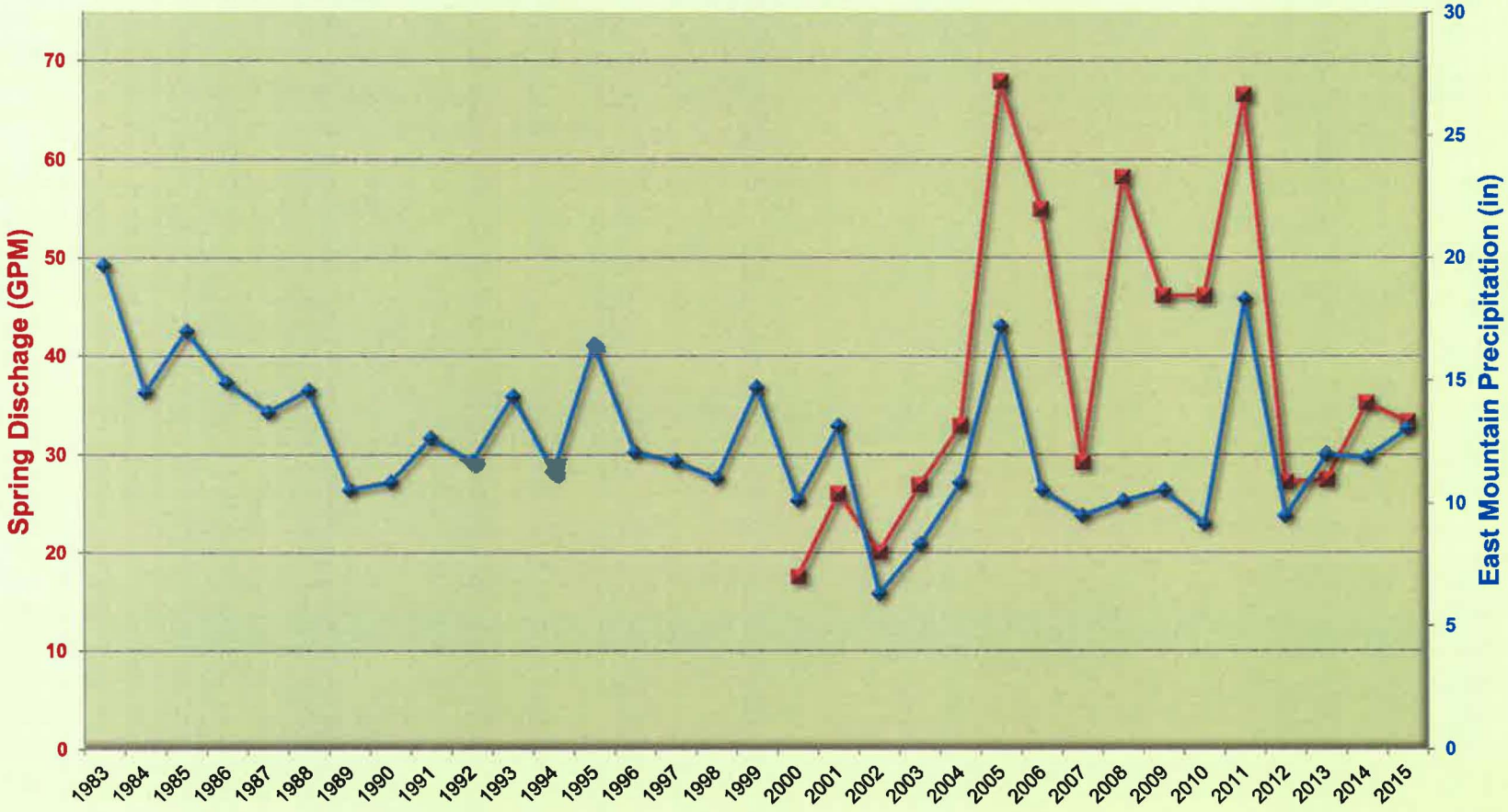
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: MF-19B vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



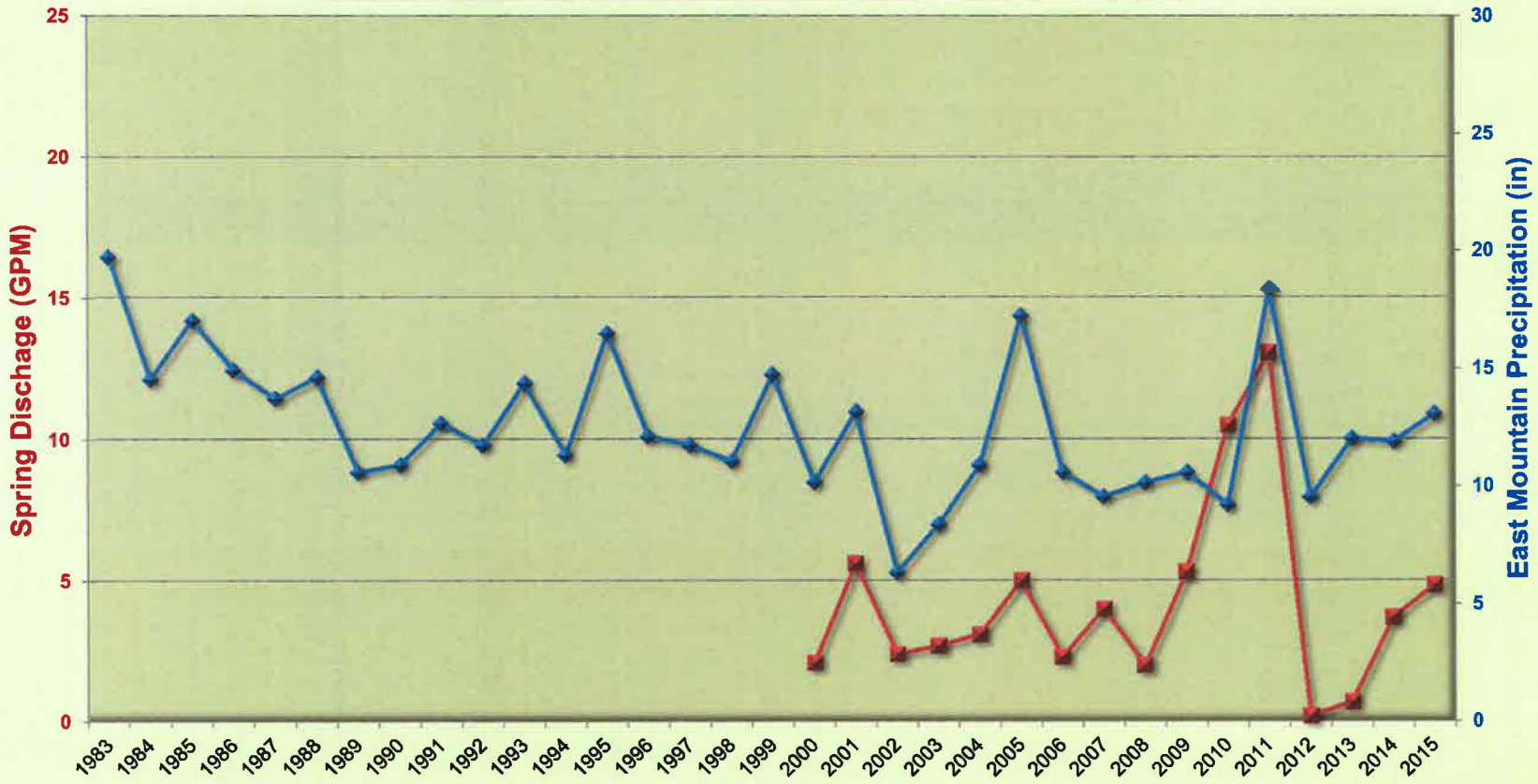
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: MF-213 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



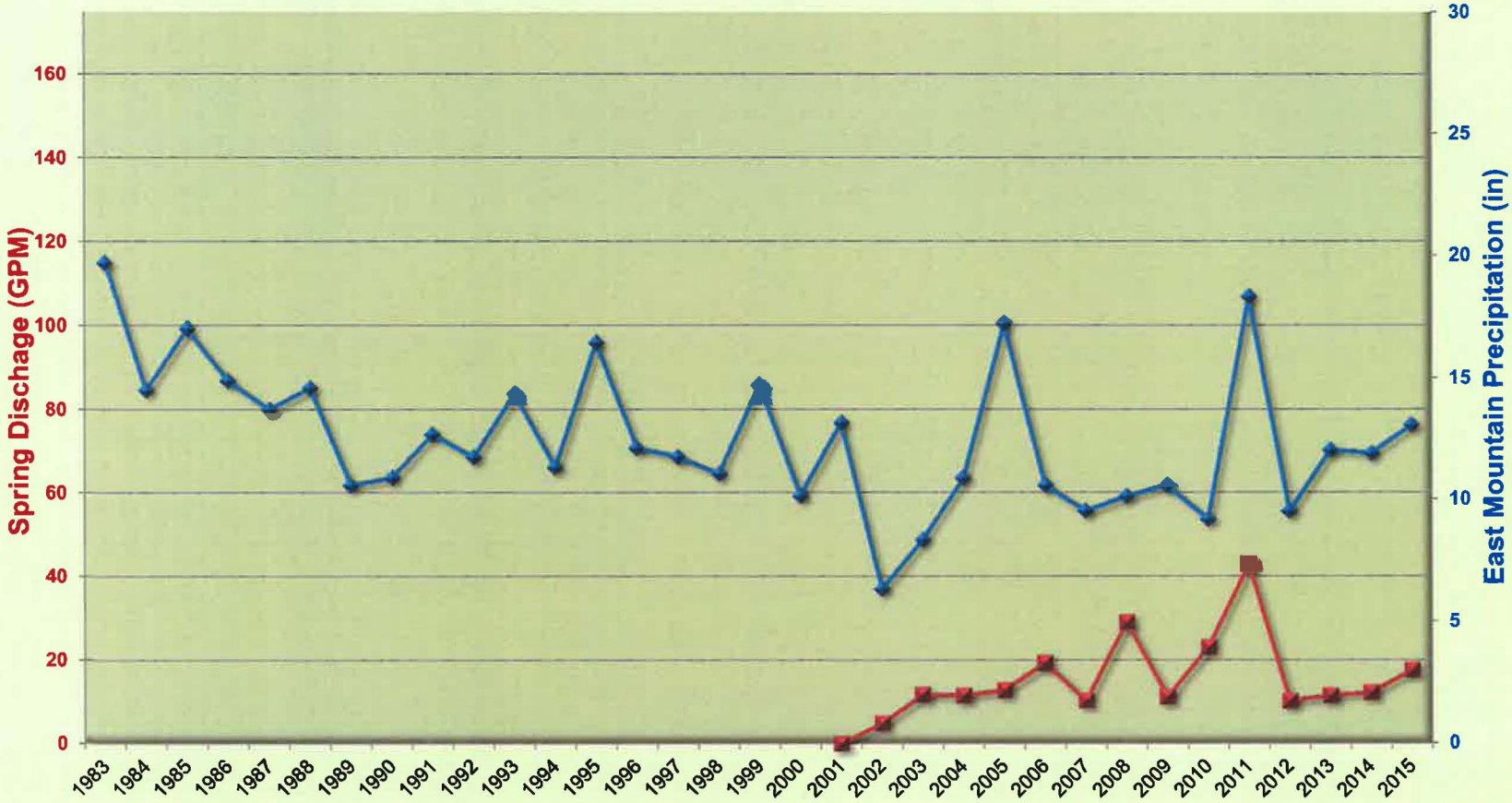
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: MF-219 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



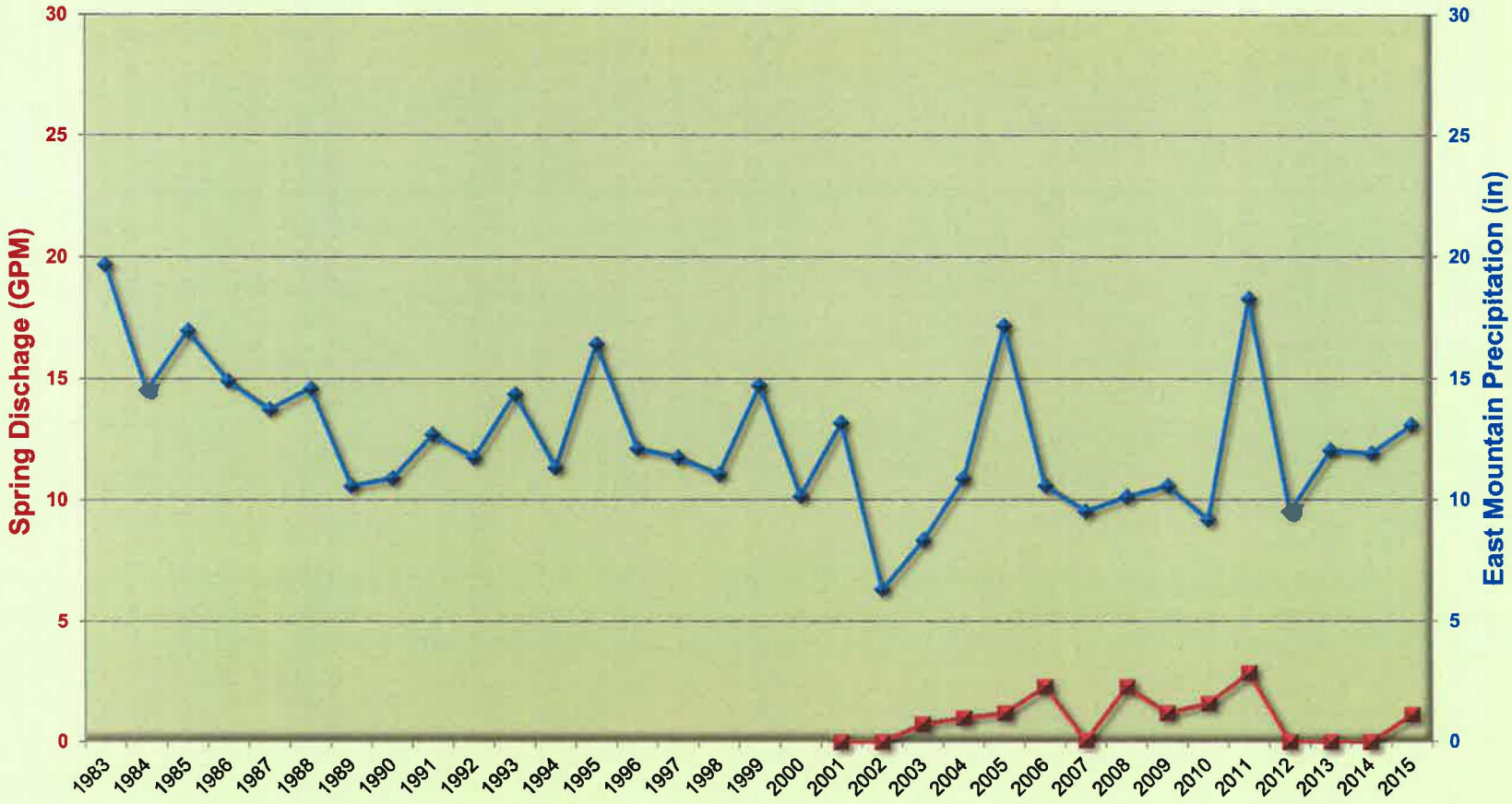
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: MFR-10 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



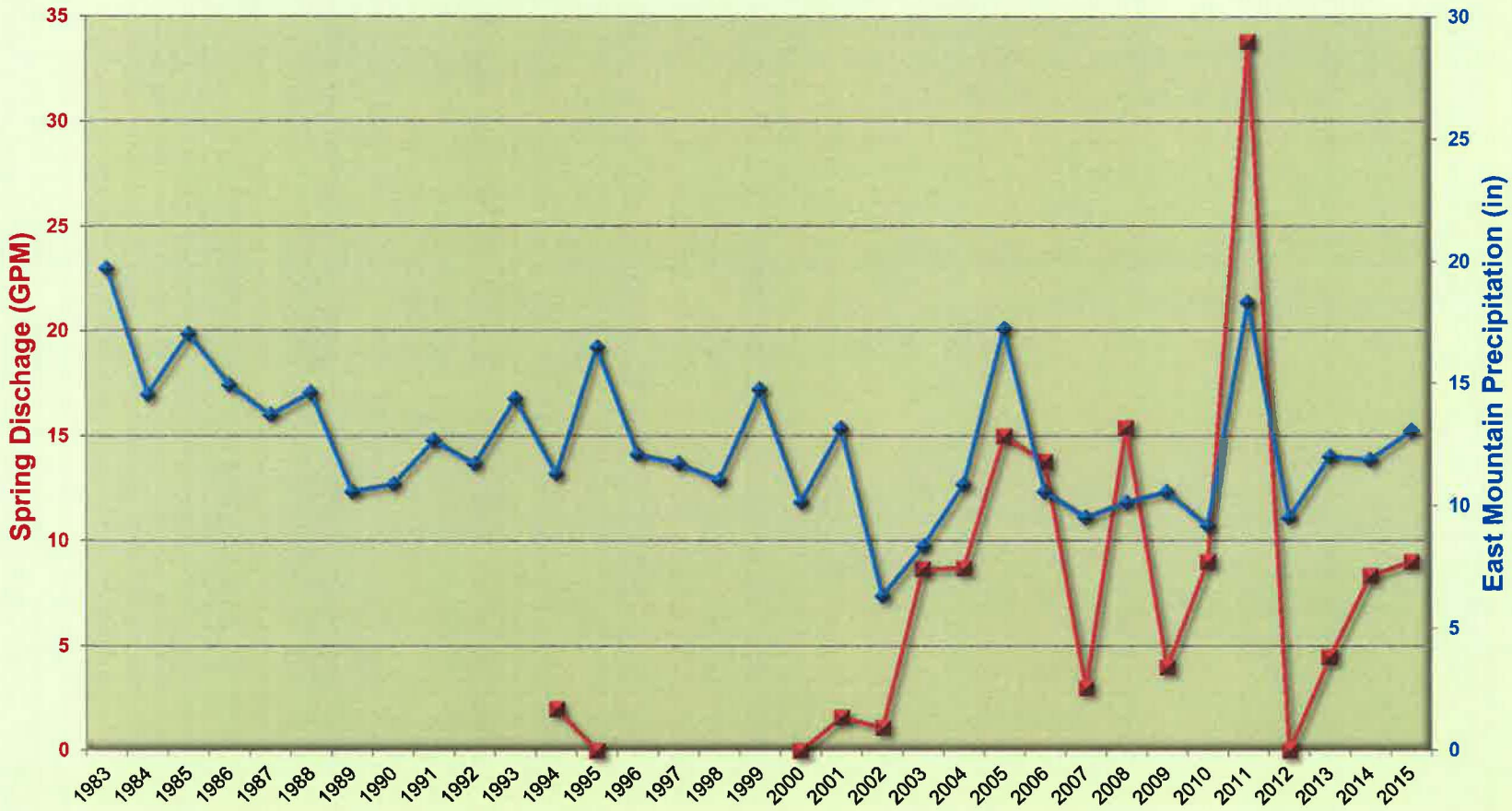
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: MFR-30 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



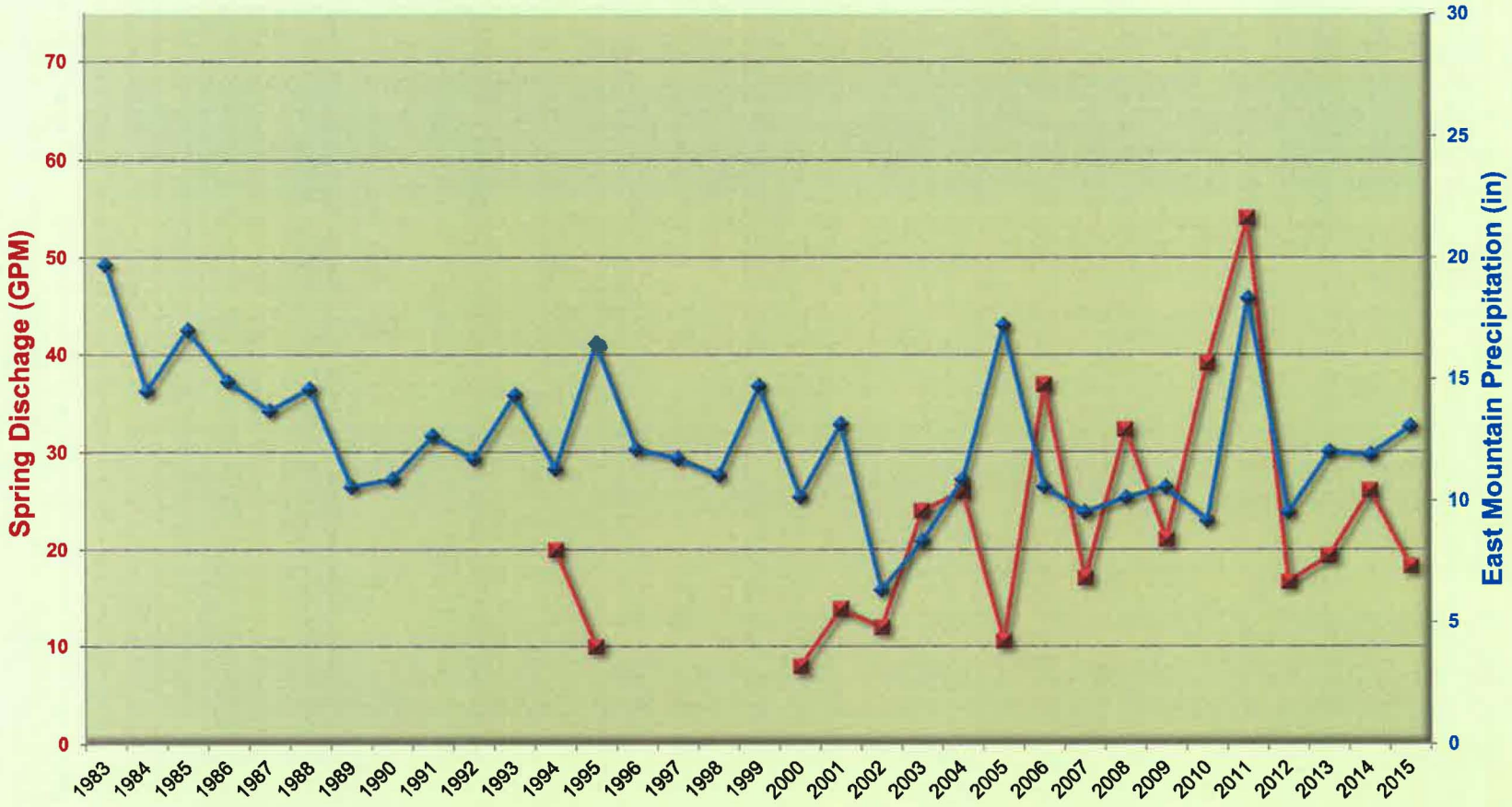
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: RR-5 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



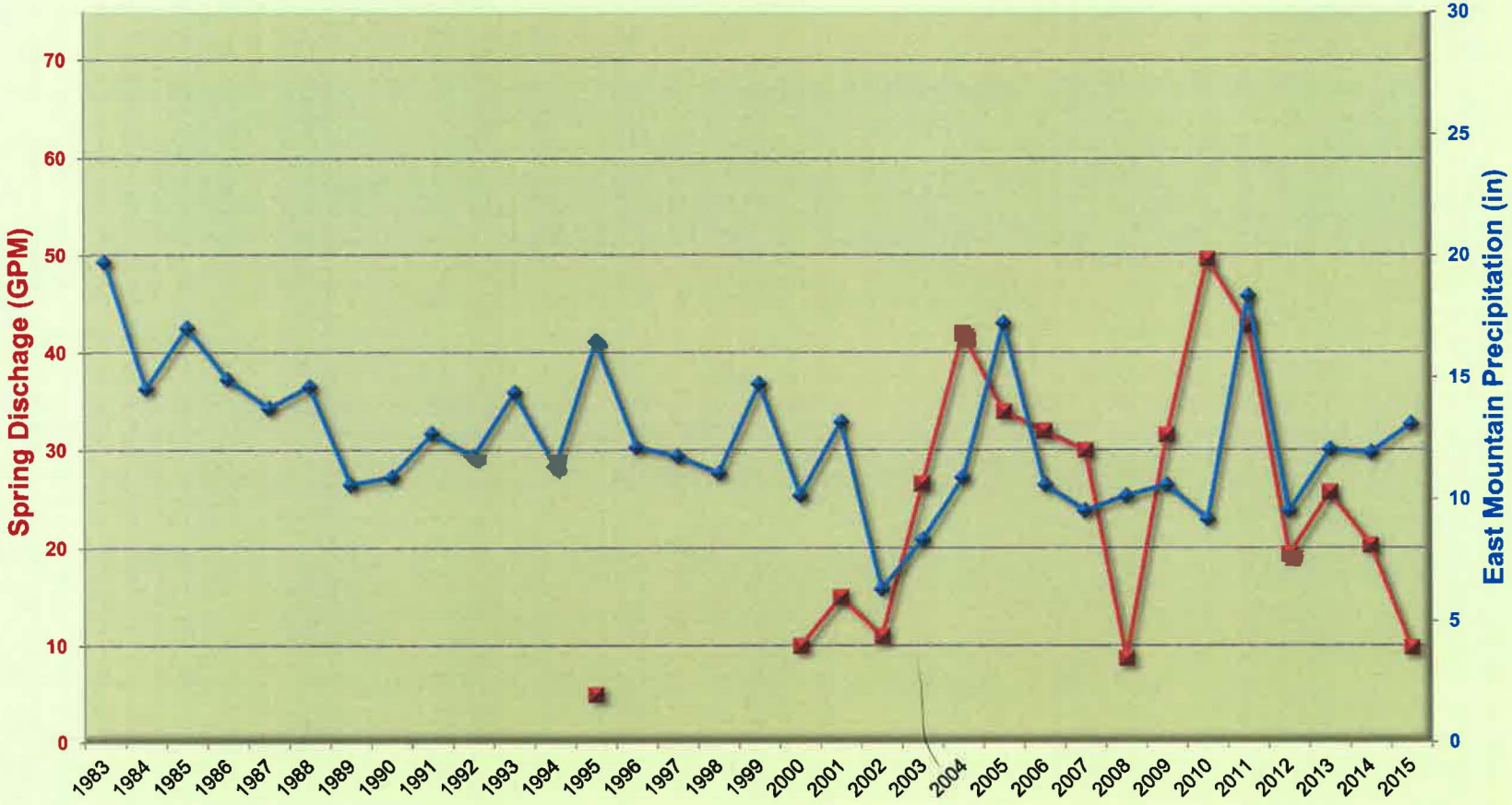
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: RR-15 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



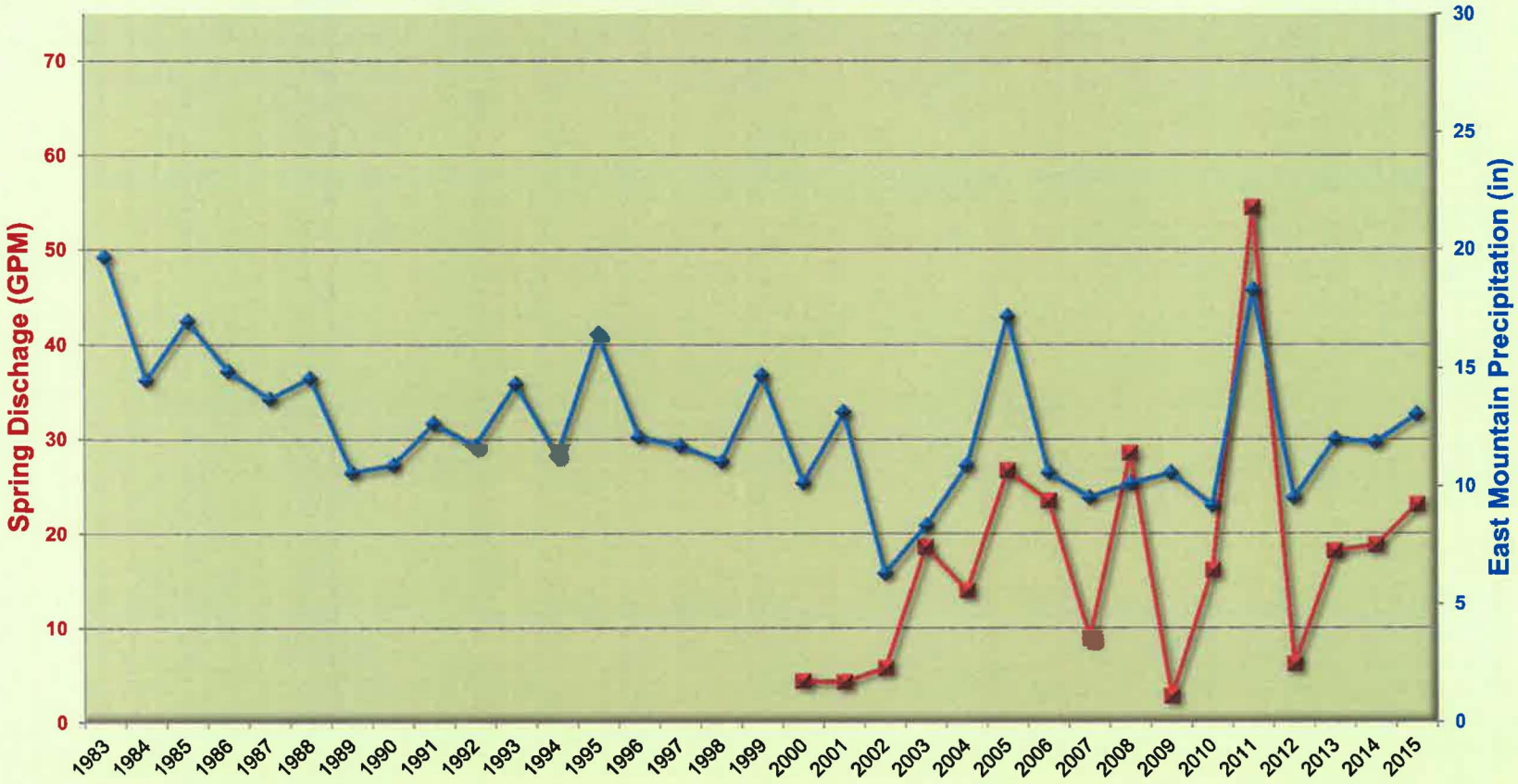
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: RR-23A vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



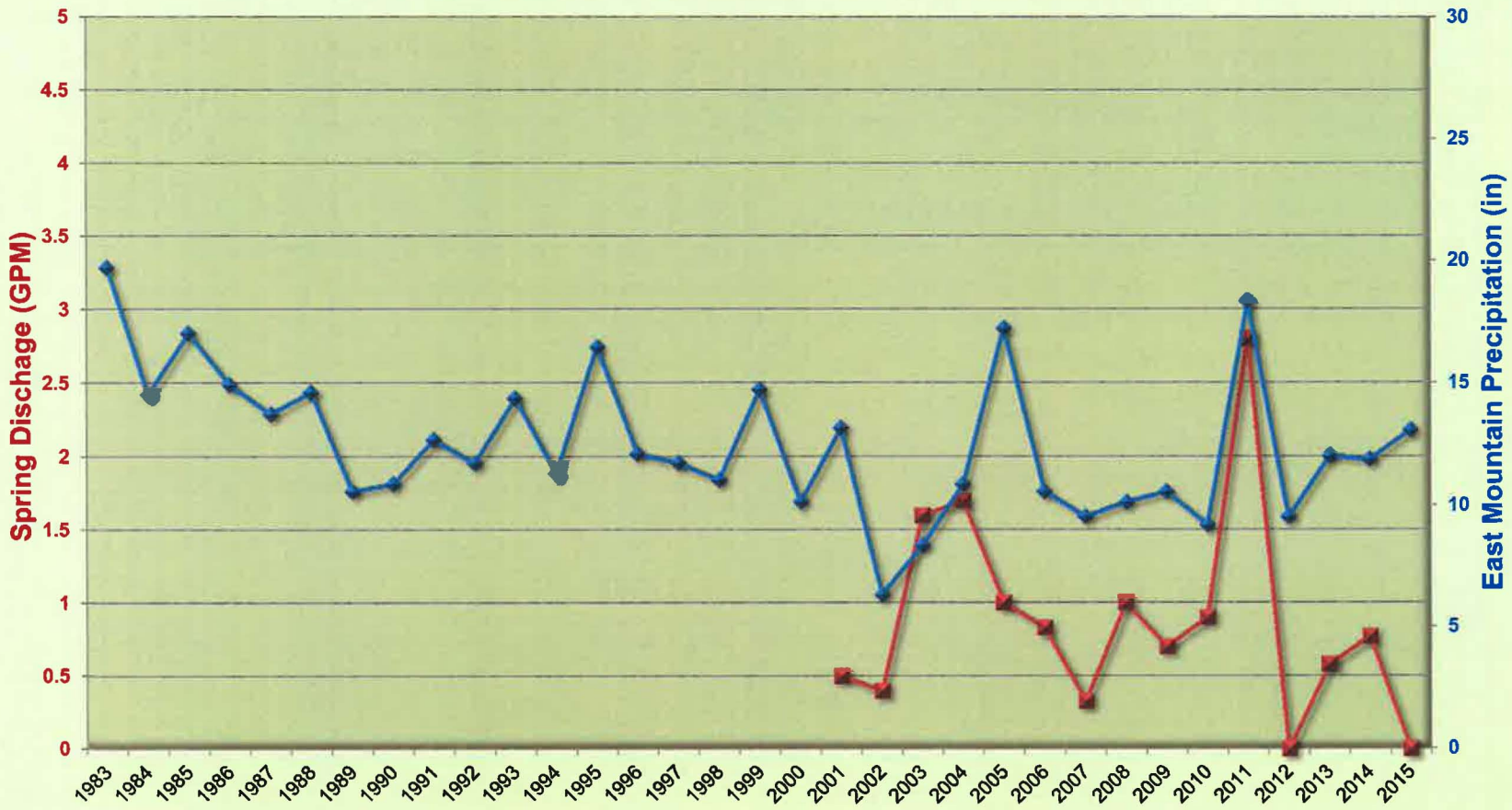
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: SPI-26 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



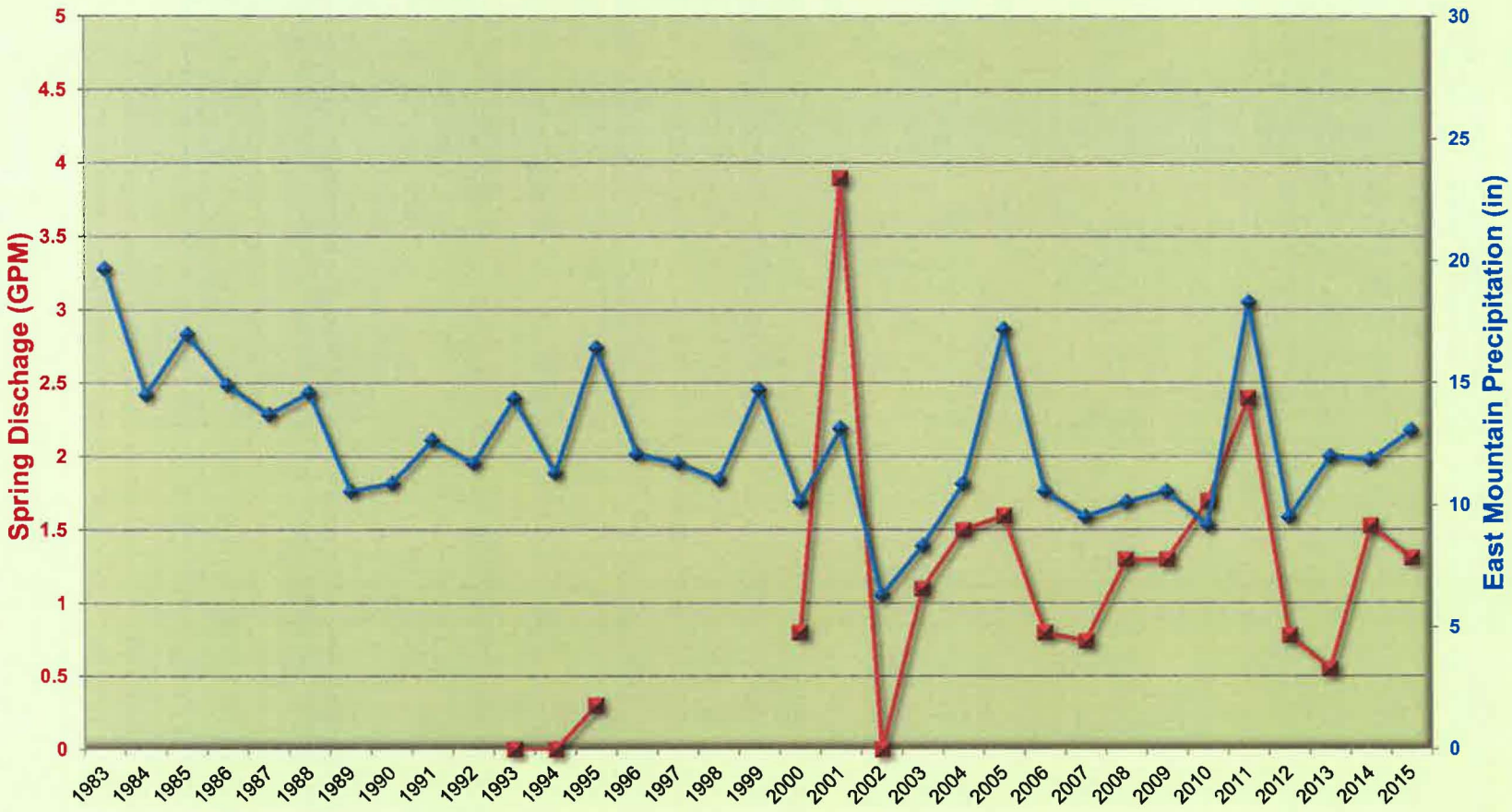
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: SPI-29 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



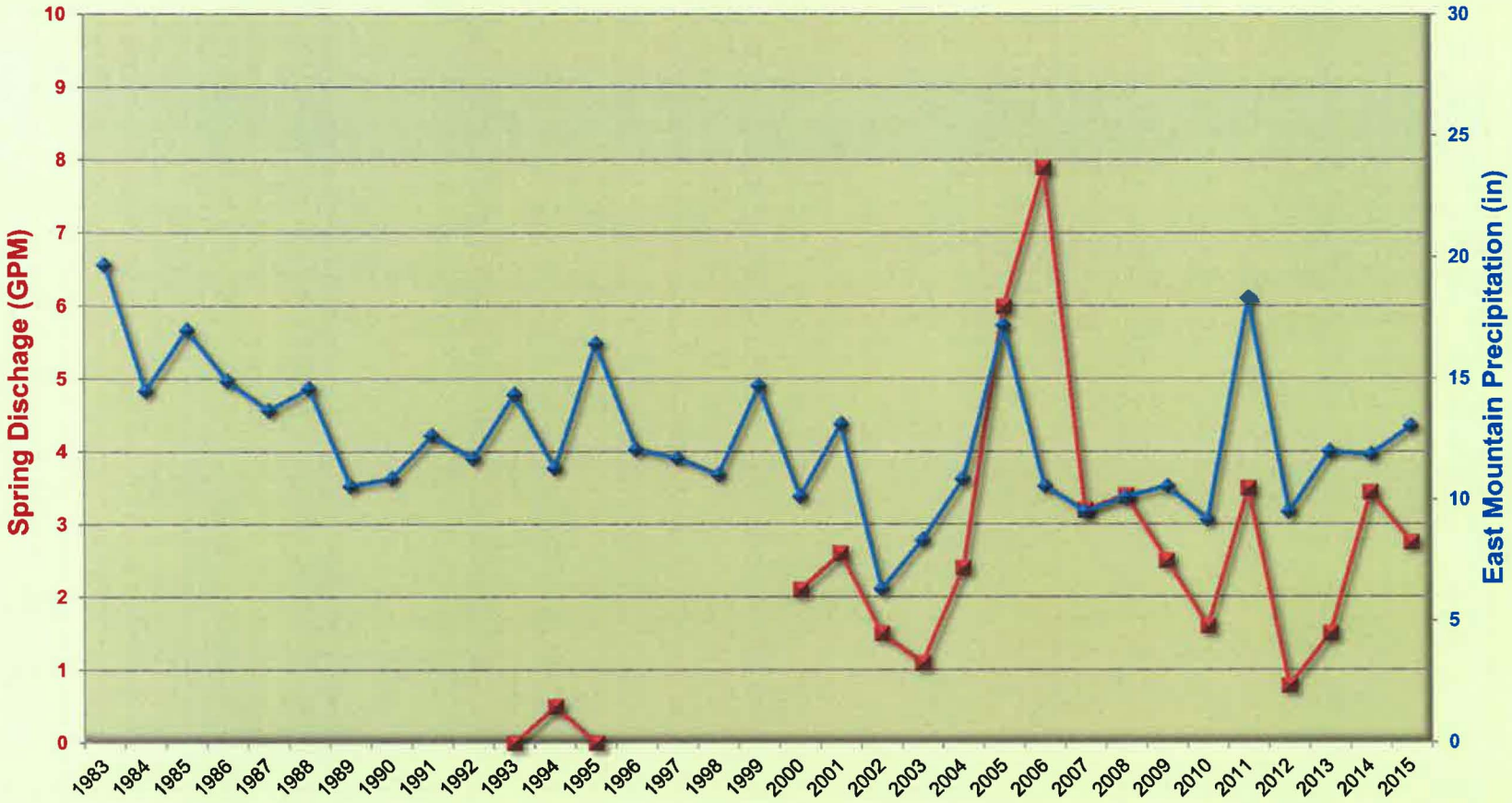
Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

EAST MOUNTAIN SPRINGS
SPRING: UJV-101 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

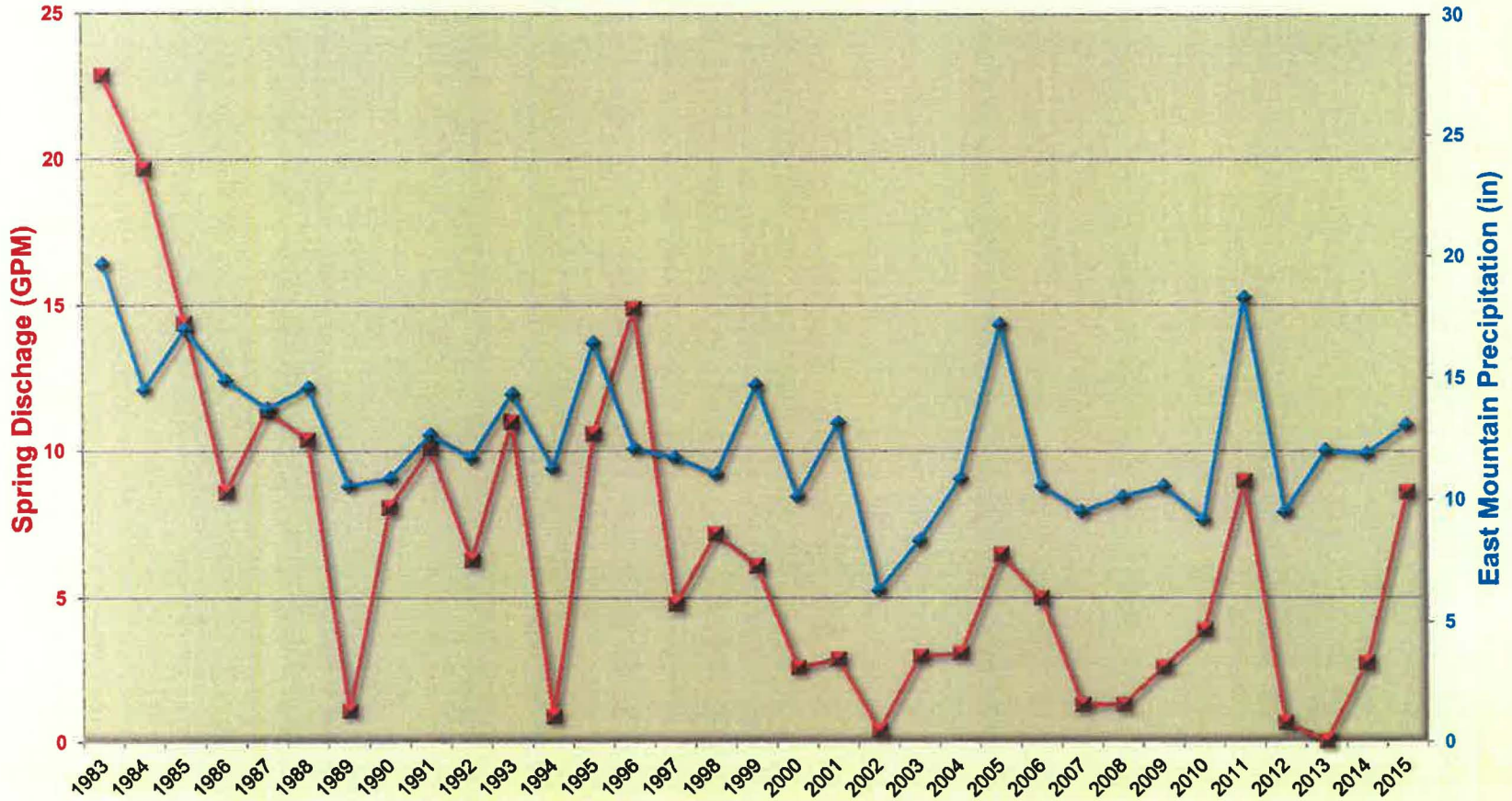
EAST MOUNTAIN SPRINGS
SPRING: UJV-206 vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



Note: July spring flow measurements occur from 2003. Prior to 2003 flow measurements may have been taken earlier in the year.

East Mountain Springs Southern Area

EAST MOUNTAIN SPRINGS
SPRING: SHEBA SPRING vs. PRECIPITATION
PEAK FLOW (JULY) vs. EAST MOUNTAIN WEATHER STATION



PACIFICORP
ENERGY WEST
HYDROLOGIC MONITORING PROGRAM
WILBERG/COTTONWOOD MINE

I. MONITORING LOCATIONS – WILBERG/COTTONWOOD MINE

A. Surface Water Hydrology (for maps refer to Deer Creek, Wilberg/Cottonwood Mine: Volume 9 Map HM-1B)

1. Cottonwood Creek Drainage System

a. ***Cottonwood Canyon Creek*** (refer to Deer Creek and Wilberg/Cottonwood Mine: Volume 9 Map HM-1B)

(1) CCC01 - USGS Flume:
(Approximately 7800 feet downstream from the outlet culvert for the disturbed area.)1500 feet North, 200 feet East of the Southwest corner of Section 31, Township 17 South, Range 7 East.

b. ***Grimes Wash*** (refer to Deer Creek and Wilberg/Cottonwood Mine: Volume 9 Map HM-1B)

(1) GWR01 - Right Fork:
(Approximately 1500 feet upstream of the inlet culvert for the disturbed area.) 550 feet North, 1500 feet West of the Southwest corner of Section 22, Township 17 South, Range 7 East.

(2) GWR02 - Left Fork:
(Approximately 50 feet upstream of the inlet culvert for the disturbed area.) 200 feet South, 2350 feet East of the Northwest corner of Section 27, Township 17 South, Range 7 East.

(3) GWR03 - Below the mine:
(Approximately 500 feet downstream of the outlet culvert below the disturbed area.) 1770 feet South, 1820 feet West of the Northeast corner of Section 27, Township 17 South, Range 7 East.

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2. **Reclamation Monitoring:** Following final reclamation, backfilling and grading monitoring will be conducted at points immediately above and below the reclaimed site.

B. Groundwater Hydrology

1. Piezometric Data

The Wilber/Cottonwood Mine has been sealed since 2001. There are no piezometric well sampling locations.

2. In-Mine Water Locations

The Wilber/Cottonwood Mine has been sealed since 2001. There are no accessible in-mine sampling locations.

3. Waste Rock Wells (None)

C. UPDES Monitoring Locations

a. ***Wilberg/Cottonwood Mines***
UPDES UT0022896
001- Mine Discharge @ Cottonwood Canyon (TMA)
003- Sediment Pond @ Mine Facilities

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II. MONITORING SCHEDULE (see enclosed monitoring schedules for operational, baseline, and reclamation monitoring)

A. Field Measurements

Field Measurements collected during quality sampling: Listed below are the sites which will be monitored by PacifiCorp - Energy West in accordance with the guidelines established by DOGM; i.e.

- Date and Time
- Flow
- pH
- Temperature
- Conductivity
- Dissolved oxygen (perennial streams only)

Surface Monitoring

Surface monitoring locations will be field monitored quarterly for all field parameters, except Indian Creek - monitoring to be conducted during baseflow only.

1. Cottonwood Canyon Creek

a. Cottonwood Canyon Creek

(1) CCC01 - USGS Flume

b. Grimes Wash

(1) GWR01
(2) GWR02
(3) GWR03

Groundwater Monitoring
There are no groundwater monitoring site for the Wilberg/Cottonwood Mine.

UPDES Monitoring

1. Wilberg/Cottonwood
UPDES sites 001, 003, will be monitored as specified in the individual permits.

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Reclamation Monitoring

Surface Water Resources: (see enclosed summary of operational, baseline, and reclamation monitoring schedules)

Surface monitoring locations will be field monitored monthly for flow and all field parameters quarterly until bond release.

Ground Water Resources: (N/A)

UPDES: Sites will be monitored as specified in the individual permits

B. Quality Sampling (Laboratory Measurements)

1. **Surface Water Hydrology:** Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed are those listed in the DOGM Guidelines for Surface Water Quality (see Table 1-Surface Water Quality Parameter List). Quarterly sampling was initiated during March 1988 and will continue throughout the year; i.e., June, September, and December. Baseline analysis was performed in 2011 and will be repeated every five years there-after.

   a. **Cottonwood Creek Drainage**

      (1) Cottonwood Canyon Creek

         (a) CCC01 - USGS Flume

      (2) Grimes Wash

         (a) GWR01
         (b) GWR02
         (c) GWR03

Reclamation Monitoring - Surface Water Hydrology: Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed are those listed in the DOGM

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Guidelines for Surface Water Quality (see Table 1-Surface Water Quality Parameter List). Sampling will be conducted on a quarterly basis until bond release. Baseline analysis will be performed on the 5th and 9th years following reclamation. In no case will baseline sampling time frame exceed 5 years converting from operational to reclamation monitoring.

2. UPDES Monitoring Sites

a. Wilberg/Cottonwood Mines

UPDES sites will be monitored as specified in the individual permits.

III. ANNUAL REPORTS

All data collected regarding the hydrology of East Mountain will be summarized by the applicant in an annual Hydrologic Monitoring Report. Copies of the report will be submitted to the Utah State Division of Oil, Gas and Mining. In addition, any raw data collected will be submitted to the Utah State Division of Oil, Gas and Mining on a quarterly basis.

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PACIFICORP
ENERGY WEST
HYDROLOGIC MONITORING PROGRAM
DEER CREEK MINE

I. MONITORING LOCATIONS – DEER CREEK MINE

A. Surface Water Hydrology (for maps refer to Deer Creek and Wilberg/Cottonwood Mine: Volume 9 Map HM-1A, Deer Creek Volume 12 R645-301-700: Hydrologic Monitoring Map MFS1851D Mill Fork Lease for East Mountain locations listed below

1. Cottonwood Creek Drainage System

a. ***Indian Creek*** (refer to Deer Creek Volume 12 R645-301-700: Hydrologic Monitoring Map MFS1851D)

(1) ICA - Indian Creek Above
(Approximately 2500 feet northwest of the Mill Fork permit boundary) 400 feet North, 2350 feet West of the Southwest corner of Section 3, Township 16 South, Range 6 East.

(2) ICF - Indian Creek Flume
(Approximately 2100 feet west of the Mill Fork permit boundary) 300 feet North, 3400 feet West of the Southwest corner of Section 10, Township 16 South, Range 6 East.

(3) ICD - Indian Creek Ditch
(Approximately 1600 feet west of the Mill Fork permit boundary, irrigation ditch for Upper Joes Valley) 240 feet North, 2850 feet West of the Southwest corner of Section 15, Township 16 South, Range 6 East.

(4) ICB - Indian Creek Below
(Approximately 3700 feet west of the Mill Fork permit boundary, junction of Indian Creek and FDR040) 70 feet North, 120 feet West of the Southwest corner of Section 16, Township 16 South, Range 6 East.

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2. Huntington Creek Drainage System

a. ***Huntington Creek*** (refer to Deer Creek and Wilberg/Cottonwood Mines: Volume 9 Map HM-1A)

(1) HCC01 - Above Deer Creek Confluence:
1400 feet north, 2200 feet west of the southeast corner of Section 36, Township 16 South, Range 7 East.

(2) HCC02 - Below Deer Creek Confluence:
300 feet north, 300 feet west of the southwest corner of Section 31, Township 16 South, Range 8 East.

(3) HCC04 - @ Research Farm*
800 feet north, 200 feet east of the southwest corner of Section 5, Township 17 South, Range 8 East.
*Not listed on map due to scale.

b. ***Deer Creek*** (refer to Deer Creek and Wilberg/Cottonwood Mines: Volume 9 Map HM-1A)

(1) DCR01 - Above the mine:
(Approximately 600 feet upstream from the mine facility.) 200 feet North, 800 feet West of the Southeast corner of Section 10, Township 17 South, Range 7 East.

(2) DCR04 - Near C1/C2 Belt Intersection:
(Approximately 5,000 feet downstream from the mine facility.) 300 feet North, 2000 feet East of the Southeast corner of Section 2, Township 17 South, Range 7 East.

(3) DCR06 - @ Huntington Creek Confluence:
(Approximately 15,000 feet downstream from the facility) 1400 feet north, 1100 feet east of the southeast corner of Section 6, Township 16 South, Range 7 East.

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c. ***Meetinghouse Canyon - South Fork*** (refer to Deer Creek, Wilberg/Cottonwood, Des-Bee-Dove Mine: Volume 9 Map HM-1)

(1) MHC01 - Meetinghouse Canyon South Fork (Approximately 200 feet upstream from the north and south convergence.) 800 feet North, 1500 feet East of the Southwest corner of Section 35, Township 16 South, Range 7 East.

d. ***Rilda Canyon*** (refer to Deer Creek and Wilberg/Cottonwood Mines: Volume 9 Map HM-1A)

(1) RCF-1 - Rilda Canyon - Right Fork: (Approximately 4000 feet upstream from the Right and Left fork convergence.) 400 feet South, 200 feet West of the Northeast corner of Section 30, Township 16 South, Range 7 East.

(2) RCLF1 - Rilda Canyon - Left Fork, below Rilda Canyon Portals: (Approximately 200 feet upstream from the Right and Left fork convergence.) 2400 feet North, 2100 feet West of the Southeast corner of Section 29, Township 16 South, Range 7 East.

(3) RCLF2 - Rilda Canyon - Left Fork, above Rilda Canyon Portals: (Approximately 1600 feet upstream from the Right and Left fork convergence.) 1600 feet North, 2300 feet West of the Southwest corner of Section 29, Township 16 South, Range 7 East.

(4) RCF2 - Rilda Canyon - Above NEWUSSD springs: 2500 feet South, 400 feet West of the Northeast corner of Section 29, Township 16 South, Range 7 East.

(5) RCF3 - Rilda Canyon - Below NEWUSSD springs: 2550 feet South, 1000 feet East of the Northeast corner of Section 28, Township 16 South, Range 7 East.

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(6) RCW4 - Rilda Canyon: (Approximately 1000 feet upstream from the confluence with Huntington Creek.) 850 feet North, 1900 feet West of the Southeast corner of Section 26, Township 16 South, Range 7 East.

e. ***Mill Fork Canyon*** (refer to Deer Creek Volume 12 R645-301-700: Hydrologic Monitoring Map MFS1851D)

(1) MFA01 - Mill Fork Canyon - Above Old Mine: (Approximately 2000 feet above old mine portals @ end of USFS development road.) 100 feet North, 1500 feet West of the Southeast corner of Section 17, Township 16 South, Range 7 East.

(2) MFB02 - Mill Fork Canyon - Above Huntington Creek Confluence: (Approximately 200 feet above confluence with Huntington Creek @ culvert outfall.) 100 feet South, 1900 feet East of the Northwest corner of Section 22, Township 16 South, Range 7 East.

(3) MFU03 - Mill Fork Canyon - Above Mill Fork Fault Crossing: (Approximately 700 feet upstream of projected Mill Fork Fault crossing) 1150 feet North, 1700 feet East of the Southwest corner of Section 17, Township 16 South, Range 7 East.

3. **Reclamation Monitoring:** Following final reclamation, backfilling and grading monitoring will be conducted at points immediately above and below the reclaimed site.

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B. Groundwater Hydrology – Deer Creek Mine

1. **East Mountain Springs** (refer to Deer Creek and Wilberg/Cottonwood Mines: Volume 9 maps HM-4)

   Sheba Springs
   80-50
   Rilda Canyon-(Meters 2&3) [1]

   [1]-NEWUSSD controls Rilda Canyon meters. Monitoring will be conducted when meters are functioning.

2. **East Mountain Springs - Mill Fork Area** (refer to Deer Creek Permit Volume 12 R645-301-700: Hydrologic Monitoring Map MFS1851D)

EM-216	MFR-30
JV-9	RR-5
JV-34	RR-15
MF-7	RR-23A
MF-10	SP1-26
MF-19B	SP1-29
MF-213	UJV-101
MF-219	UJV-206
MFR-10	UJV-213
EMPOND	Grants Spring
Little Bear Spring	

3. **Piezometric Data**

   a. Surface

      (1) Rilda Canyon (refer to Deer Creek and Wilberg/Cottonwood Mines: Volume 9 Map HM-1a)

      P1
      P5
      P6
      P7
      EM-47

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C. UPDES Monitoring Locations – Deer Creek Mine

a. ***Deer Creek Mine***
UPDES UT0023604
001- Sediment Pond
002- Mine Discharge

II. MONITORING SCHEDULE – DEER CREEK MINE
(see enclosed monitoring schedules for operational, baseline, and reclamation monitoring)

A. Field Measurements

Field Measurements collected during quality sampling: Listed below are the sites which will be monitored by PacifiCorp - Energy West in accordance with the guidelines established by DOGM; i.e.

- Date and Time
- Flow
- pH
- Temperature
- Conductivity
- Dissolved oxygen (perennial streams only)

Surface Monitoring

Surface monitoring locations will be field monitored quarterly for all field parameters, except Indian Creek - monitoring to be conducted during base flow only.

1. Cottonwood Canyon Creek

a. Indian Creek

(1) ICA
(2) ICF
(3) ICD
(4) ICB

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2. Huntington Canyon Drainage

a. Deer Creek

(1) DCR01
(2) DCR04
(3) DCR06

b. Huntington Creek

(1) HCC01
(2) HCC02
(3) HCC04

Flow in Huntington Creek is measured only at HCC01 by Utah Power, and will be reported in the Annual Hydrologic Report.

c. Meetinghouse Canyon - South Fork:

(1) MCH01

d. Rilda Canyon

(1) RCF1*
(2) RCLF 1
(3) RCLF 2
(4) RCF2
(5) RCF3
(6) RCW4

* Baseline flow will be measured adjacent to EM-163

e. Mill Fork Canyon

(1) MFA01
(2) MFB02
(3) MFU03

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PACIFICORP
ENERGY WEST
HYDROLOGIC MONITORING PROGRAM
DEER CREEK MINE

Groundwater Monitoring

1. East Mountain Springs (see monitoring location list I.B.1)

2. East Mountain Springs - Mill Fork Area (see monitoring location list I.B.3)

   East Mountain Springs will be field monitored during the months of July and October. Rilda Canyon Springs - (NEWUSSD: Meters 2 & 3; when functioning) will be field monitored monthly depending upon access.

3. Piezometric Wells

   a. Surface

      Piezometric surface wells will be field monitored for level only on a monthly basis depending upon access.

      (1) Rilda Canyon (see Map HM-1 for locations)

      P1
      P5
      P6
      P7
      EM-47

UPDES Monitoring

1. Deer Creek

UPDES sites 001 and 002 will be monitored as specified in the individual permits.

Reclamation Monitoring

<u>Surface Water Resources:</u> (see enclosed summary of operational, baseline, and reclamation monitoring schedules)
Surface monitoring locations will be field monitored monthly for flow and all field parameters quarterly until bond release.

<u>Ground Water Resources:</u> (see enclosed summary of operational, baseline, and reclamation monitoring schedules)

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Springs	East Mountain Springs will be field monitored during the months of July and October. Rilda Canyon Springs (NEWUSSD: Meters 2 & 3; when functioning) will be field monitored monthly for flow depending upon access. East Mountain Springs (including Rilda Springs) monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.
Wells:	Piezometric surface wells (Rilda Canyon and Cottonwood Canyon): will be field monitored for level only on a monthly basis depending upon access. Piezometric surface well monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.
UPDES:	Sites will be monitored as specified in the individual permits

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B. Quality Sampling (Laboratory Measurements)

1. **Surface Water Hydrology:** Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter, except for Indian Creek - quality samples will be collected during baseflow only. Parameters analyzed are those listed in the DOGM Guidelines for Surface Water Quality (see Table 1-Surface Water Quality Parameter List). Quarterly sampling was initiated during March 1988 and will continue throughout the year; i.e., June, September, and December. Baseline analysis was performed in 2011 and will be repeated every five years there-after.

a. Cottonwood Creek Drainage

(1) Indian Creek

(a) ICA
(b) ICD
(c) ICB

b. Huntington Creek Drainage

(1) Deer Creek

(a) DCR01
(b) DCR04
(c) DCR06

(2) Huntington Creek

(a) HCC01
(b) HCC02
(c) HCC04

(3) Meetinghouse Canyon - South Fork:

(a) MCH01

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(4) Rilda Canyon

(a) RCF1
(b) RCF3
(c) RCW4

(5) Mill Fork Canyon

(a) MFA01
(b) MFB02
(c) MFU03

Reclamation Monitoring - Surface Water Hydrology: Water samples will be collected and analyzed quarterly (one sample at low flow and high flow) during the first or second week of the quarter. Parameters analyzed are those listed in the DOGM Guidelines for Surface Water Quality (see Table 1-Surface Water Quality Parameter List). Sampling will be conducted on a quarterly basis until bond release. Baseline analysis will be performed on the 5th and 9th years following reclamation. In no case will baseline sampling time frame exceed 5 years converting from operational to reclamation monitoring.

2. Groundwater Hydrology

a. East Mountain Springs: Water samples will be collected and analyzed during the months of July and October. Rilda Canyon Springs (NEWUSSD: Meters 2 & 3; when functioning) will be monitored for quarterly for quality. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table 2-Ground Water Quality Parameter List).

b. Wells: No analysis required.

Baseline analysis was performed in 2011 and will be repeated every five years thereafter.

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Reclamation Monitoring - Groundwater Hydrology:

a. East Mountain Springs: Water samples will be collected and analyzed during the months of July and October. Rilda Canyon Springs (NEWUSSD: Meters 2 & 3; when functioning) will be monitored quarterly for quality. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table 2-Ground Water Quality Parameter List). East Mountain Springs (including Rilda Springs) monitoring will be conducted until permit area reduction approval or unless otherwise approved by the Division.

b. Wells: Rilda wells will be sealed during final reclamation. Quarterly sampling will continue until sealing. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table 2-Ground Water Quality Parameter List).

c. Post Reclamation Monitoring: PacifiCorp commits to conduct annual surveys to identify new discharge locations within and below sealed portals. If discharge occurs, one water sample will be collected and analyzed per location quarterly. Parameters analyzed are those listed in the DOGM Guidelines for Groundwater Water Quality (see Table 2-Ground Water Quality Parameter List). Baseline analysis will be performed on the 5th and 9th year.

3. **UPDES Monitoring Sites**

a. Deer Creek Mine

UPDES sites will be monitored as specified in the individual permits.

III. ANNUAL REPORTS

All data collected regarding the hydrology of East Mountain will be summarized by the applicant in an annual Hydrologic Monitoring Report. Copies of the report will be submitted to the Utah State Division of Oil, Gas and Mining. In addition, any raw data collected will be submitted to the Utah State Division of Oil, Gas and Mining on a quarterly basis.

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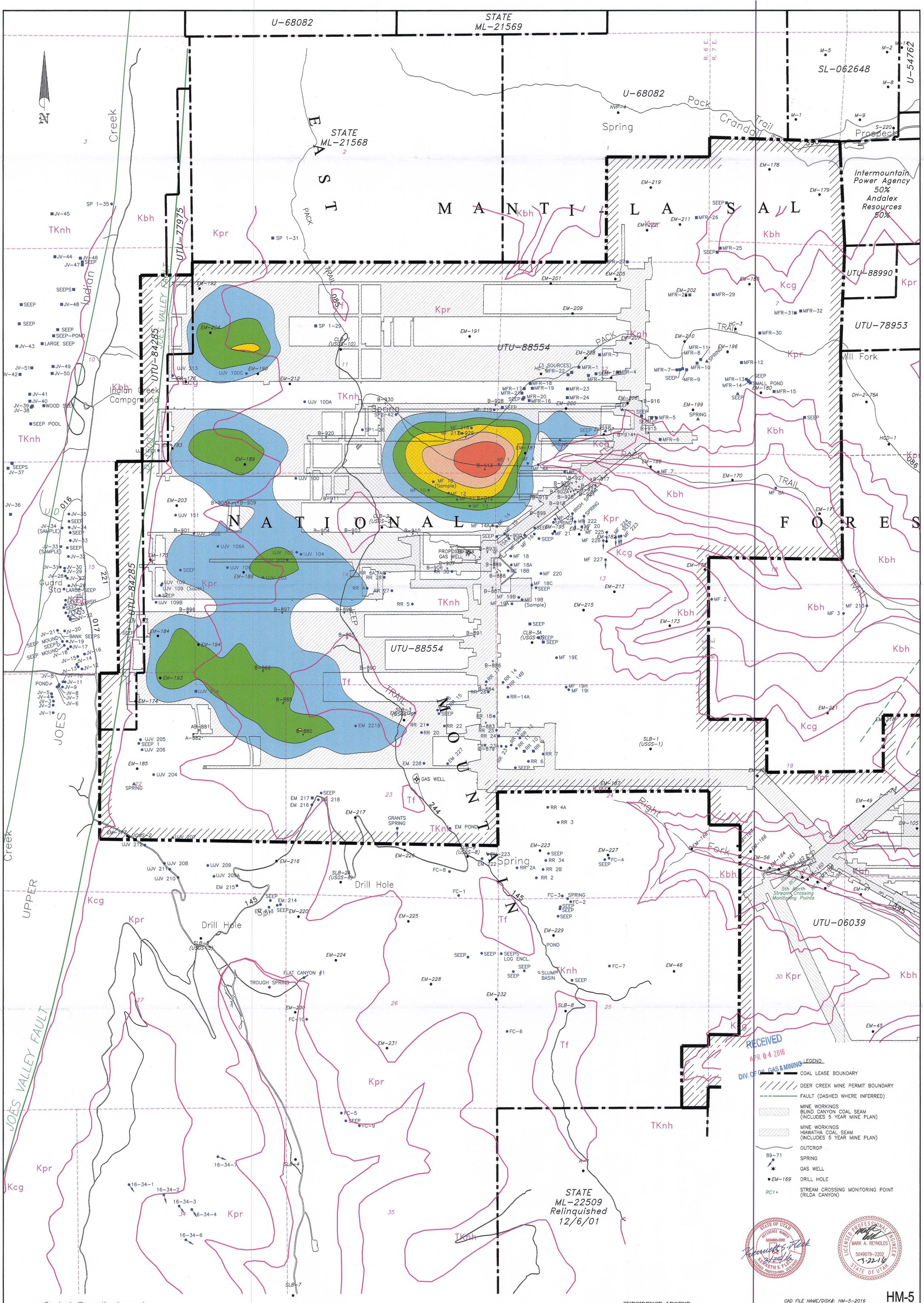

Geologic Formation Legend

Qal	Alluvial Deposits (Stream bed deposits, Alluvial fans, etc.)
Tf	Flagstaff Limestone
TKn	North Horn Formation
Kpr	Upper Price River Formation
Kc	Castlegate Sandstone
Kbh	Blackhawk Formation
Ksp	Star Point Sandstone
Kmm	Mancos Shale (Masuk Member)

SUBSIDENCE LEGEND

- 2-4 FEET
- 4-6 FEET
- 6-8 FEET
- 8-10 FEET
- 10-12 FEET

CAD FILE NAME/DISK#: HM-5-2016

HM-5

INTERWEST MINING COMPANY
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SPRING MAP
EAST MANTI-LA SAL
AND 2015 SUBSIDENCE ZONES

DRAWN BY:	K. LARSEN	CE-10904-EM	
SCALE:	1"=1000'	DRAWING #:	
DATE: FEBRUARY 16, 2016	SHEET 1 OF 1	REV.	

DATE	REVISIONS	BY	CHK
4-3-97	REVISED TRAIL MTN. MINE LEASE BOUNDARY	KJL	
5-20-97	ADDED FOREST SERVICE SPECIAL USE PERMIT	KJL	
9-18-97	ADDED RILDA CANYON RIGHT FORK TRAIL	KJL	
3-19-98	REVISED PERMIT BOUNDARIES	KJL	
1-28-99	UPDATED PERMIT BOUNDARY U-06039	KJL	
1-24-00	REVISED PERMIT BOUNDARIES	KJL	
1-02-02	RELOCATED UT-0022896-001 TO TMA	KJL	
3-7-02	ADDED IBC TO U-06039	KJL	
2-16-04	ADDED MILL FORK LEASE ML-48258	KJL	
4-14-05	UPDATED DRILL HOLES IN ML-48258	KJL	
2-14-06	UPDATED DRILL HOLES IN ML-48258	KJL	
3-21-07	UPDATED DRILL HOLES IN ML-48258	KJL	
5-6-09	UPDATED DRILL HOLES IN ML-48258	KJL	
8-11-09	ADDED DRILL HOLE EM-212 AND REVISED ROADS TO REFLECT AERIAL PHOTOGRAPH	KJL	
3-17-11	ADDED DRILL HOLES EM-213, EM-214, AND EM-215 & UPDATED LEASE RELINQUISHMENT	KJL	
2-16-12	REVISED TO INCLUDE 2011 EXPLORATION DRILL HOLES THROUGH EM-225	KJL	
11-13-12	REVISED TO INCLUDE 2012 EXPLORATION DRILL HOLES, ADDED COTTONWOOD CREEK GAGING STATION	KJL	
1-31-13	ADDED LEASE MODIFICATION BOUNDARIES	KJL	
2-20-14	REVISED DEER CREEK PERMIT BOUNDARY AND UPDATED DRILL HOLES FROM 2013	KJL	
3-6-15	HIGHLIGHTED WATER MONITORING LOCATIONS	KJL	
3-17-16	REMOVED ALL REFERENCE TO TRAIL MTN.	KJL	

FOR DETAILED HYDROLOGY REFER TO MAP MFS1851D

DRAINAGE DIVIDE

HUNTINGTON CREEK DRAINAGE

ISOLATED RECHARGE UNSATURATED STRATA

VERTICAL RECHARGE

COTTONWOOD CREEK DRAINAGE

LEGEND

- MONITORING WELL
- DRAINAGE DIVIDE
- UPDES DISCHARGE LOCATION
- TYPICAL GROUND WATER MOVEMENT
- GAS WELL
- PACIFICORP EAST/TRAIL MOUNTAIN PROPERTY BOUNDARY
- PERMIT AREA BOUNDARY
- FAULT (DASHED WHERE INFERRED)
- WATER MONITORING STATION WITH FLUME
- WATER MONITORING STATION

WATER MONITORING LOCATIONS

- COTTONWOOD MINE
- DEER CREEK MINE

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STATE OF UTAH REFERENCE NUMBER 5234167-2250 CHARLES A. SEMBOROSKI LICENSED PROFESSIONAL GEOLOGIST

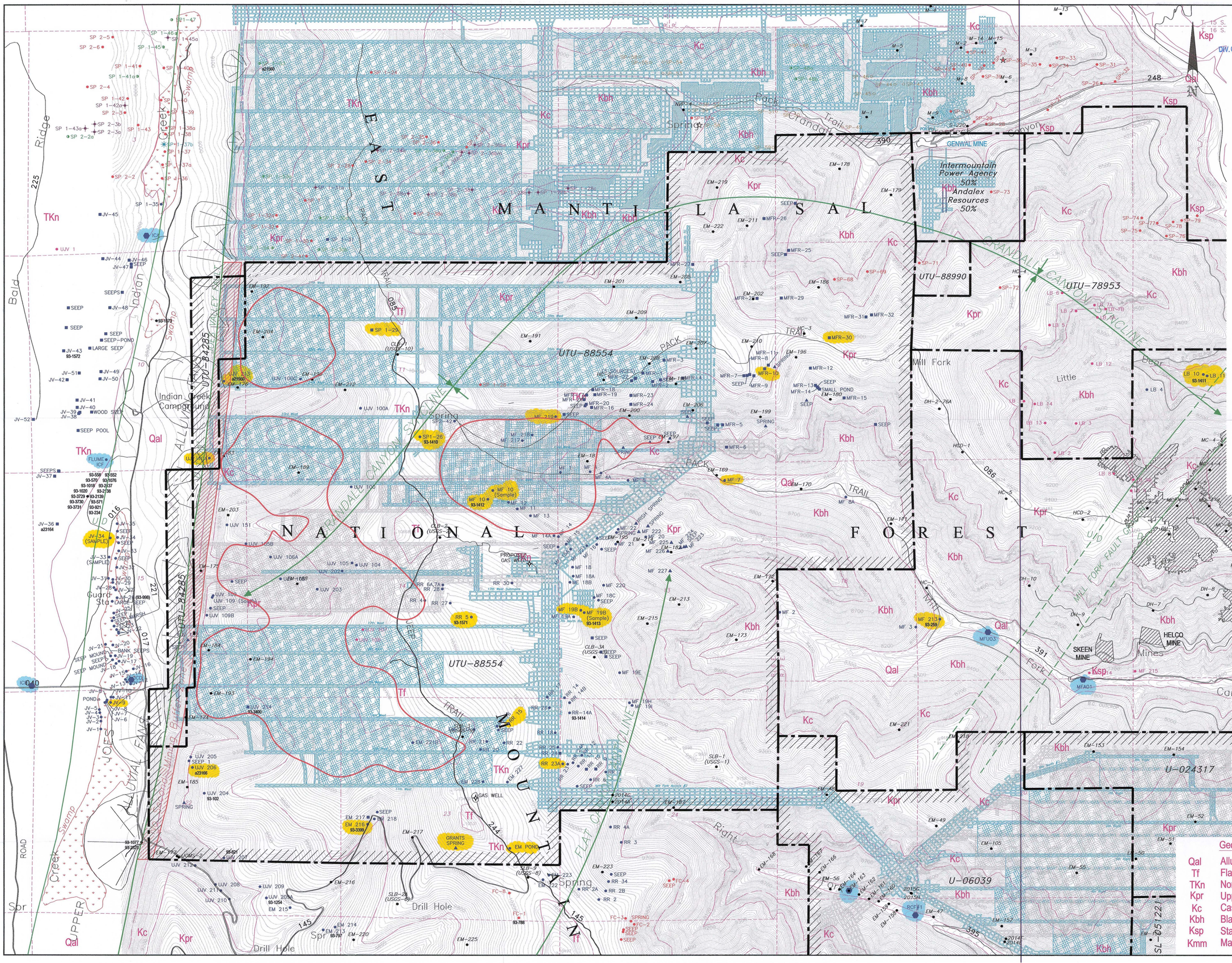
CAD FILE NAME/DISK#: HM-1

HM-1

INTERWEST MINING COMPANY
A SUBSIDIARY OF PACIFICORP

EAST MOUNTAIN PROPERTY HYDROLOGY DATA MAP

DRAWN BY:	K. LARSEN	CE-10478-EM	
SCALE:	1"=2000'	DRAWING #:	
DATE:	MARCH 17, 2016	SHEET 1 OF 1	REV. ___



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DEER CREEK MINE – MILL FORK AREA
LEASES UTU-88554/UTU-84285
HYDROLOGIC MONITORING MAP

DRAWN BY:	K. LARSEN	MFS1851D	
SCALE:	1"=1000'	DRAWING #:	
DATE:	MARCH 17, 2016	SHEET 1 OF 1	REV. 19

LEGEND

- COAL LEASE BOUNDARY
- DEER CREEK MINE PERMIT BOUNDARY
- FAULT (DASHED WHERE INFERRED)
- BLIND CANYON SEAM MINE WORKINGS (EXISTING)
- HIAWATHA SEAM MINE WORKINGS (EXISTING)
- 248 FOREST SERVICE ROAD OR TRAIL ROUTE I.D. NUMBER
- OUTCROP
- EM-169 DRILL HOLE
- ACTUAL SUBSIDENCE AS OF SEPTEMBER 2015 TWO FOOT OR GREATER BOUNDARY

SPRING LEGEND

- MFB02 SURFACE WATER MONITORING LOCATION
- SPRING LOCATAION (1994–1995 SURVEY)
- GPS LOCATED 2000
- GPS LOCATED 2001
- GPS LOCATED 2002
- GPS LOCATED 2010–2011
- SPRING LOCATION (1992 SURVEY)
- SPRING MONITORING LOCATION (INTERWEST)
- 93-2139 GROUND WATER RIGHTS
- 93-198 SURFACE WATER RIGHTS
- SPRING LOCATION (1991 SURVEY)
- SPRING LOCATION (1989–1990 SURVEY)
- SPRING LOCATION (1987 SURVEY
- SPRING LOCATION (1985 SURVEY)
- MONITORING LOCATIONS (GENWAL RESOURCES)

STATE OF UTAH
DIVISION OF OIL, GAS & MINING
801-538-5340
CHARLES R. HENRIKSEN
DIRECTOR

FINAL R2P2 MINE WORKINGS UPDATED TO JANUARY 7, 2015 THE LAST DATE OF COAL PRODUCTION.

MOVED GENWAL UNDERGROUND MINE WORKINGS 80.38' EAST AND 19.56' NORTH

Geologic Formation Legend

Qal	Alluvial Deposits (Stream bed deposits, Alluvial fans, etc.)
Tf	Flagstaff Limestone
TKn	North Horn Formation
Kpr	Upper Price River Formation
Kc	Castlegate Sandstone
Kbh	Blackhawk Formation
Ksp	Star Point Sandstone
Kmm	Mancos Shale (Masuk Member)