

Initial Study Report Meeting Wallowa Falls Hydroelectric Project FERC Project No. 308

Day 1 - January 15, 2013





Welcome

Purpose of Meeting:


- to review the study methods and results to date,
- to discuss PacifiCorp's proposed modifications, if any, to the study plan in light of the progress of the studies and data collected.

Introductions

Process Schedule

Wallowa Falls Relicensing - Near Term Schedule

Party	Milestone	Date
FERC	Director's Study Plan Determination	January 4, 2012
PacifiCorp	Conduct Studies	Spring-Fall 2012
All stakeholders	Study Progress Meeting	October 23, 2012
PacifiCorp	Study Progress Report	December, 2012
PacifiCorp	File Initial Study Report (ISR)	January 3, 2013
All stakeholders	Initial Study Report Meeting	By January 17, 2013
PacifiCorp	File ISR Meeting Summary	By February 2, 2013
All Stakeholders	Disputes/Requests to Amend Study Plan Due to FERC	March 3, 2013
All Stakeholders	Responses to Requests Due to FERC	April 3, 2013
FERC	Director's Determination	May 3, 2013
PacifiCorp	Second Study Season <small>(as needed)</small>	Spring Summer 2013
PacifiCorp	Final Technical Report <small>(assumes 1 study season)</small>	June 2013
PacifiCorp	File Preliminary Licensing Proposal	October 1, 2013



Party	Milestone	Date
All stakeholders	Preliminary Licensing Proposal Comments Due	December 30, 2013
PacifiCorp	File Updated Study Report (USR)	January 3, 2014
All stakeholders	Updated Study Report Meeting	By January 17, 2014
PacifiCorp	File USR Meeting Summary	February 2, 2014
PacifiCorp	File Final License Application	February 28, 2014
PacifiCorp	Issue Public Notice of App. Filing	March 14, 2014
Party	Post Filing Milestone	Date
FERC	Issue Public Tendering Notice	March 14, 2014
FERC	Director's Determination on Any Additional Study Requests	March 30, 2014
FERC	Issue Ready for EA Notice	April 29, 2014
Agencies	Terms, Condit's, Recomm's Due	June 28, 2014
FERC	Issue License Order	March 25, 2015

Geology and Soils

Brent Black
Engineering Geologist
Cornforth Consultants, Inc.



Geology and Soils Study

Objectives: Characterize existing geology, evaluate long-term surficial erosion potential in the Project area, identify potential slope instability issues and geologic hazards that could pose a risk to both the Project facilities and the surrounding drainages, and recommended remediation measures as necessary.

Study Area: Lands adjacent to the proposed Project boundary including the forebay, access road, penstock, and tailrace.

Methods:

- Desktop analysis of existing maps and publications to develop knowledge concerning project operations and history, local geology, and known geologic hazards.
- Conduct field reconnaissance to identify: geologic hazards, slope stability concerns (cuts and fills), and erosion potential.
- Assess the risk from geologic hazards, slope stability issue and erosion, and develop conceptual options and cost estimates for remedial assessment.



Geology and Soils Study (continued)

Field Work Conducted to Date and Study Status:

- The desktop analysis was completed in August, 2012.
- A three-day walking field reconnaissance was conducted on September 17-19, 2012 by an engineering geologist and a geotechnical engineer. Work included assessment of: geomorphology, surficial geology, potential geologic hazards, slope stability and erosion concerns within the study area. Areas observed include the slopes adjacent to the forebay, access road, penstock, bypass reach and tail race.
- A risk and needs assessment was performed.

Variance to Study Plan: No variances from the study plan have occurred to date. At this time, it appears that the field data collected is sufficient to meet study objectives.



Geology and Soils Study (continued)

Geology:

- Northern portion of project (tailrace, powerhouse, and lower penstock section) consists of glacial deposits and alluvium. Characterized by thicker overburden materials and granular soils.
- Southern portion of project (middle and upper penstock sections and forebay) consists of volcanic and metavolcanic rocks (principally pyroclastics and andesite). Characterized by relatively thin soils and talus deposits.

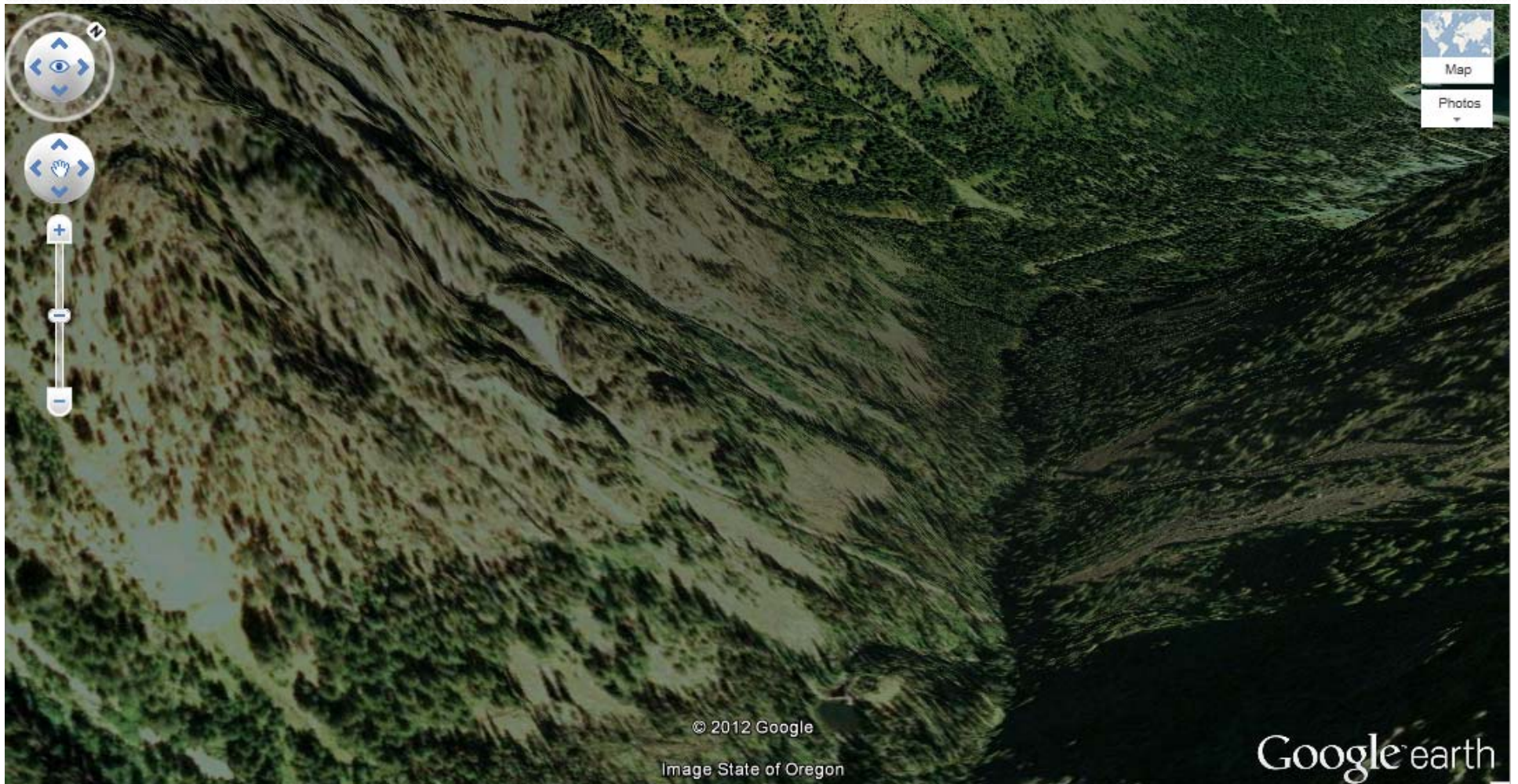


Geology and Soils Study (continued)

Geologic Hazards:

- The project area has no history of large translational landslides and no signs of ancient landslide terrain or global instability were observed during the site reconnaissance.
- No historically active deep-seated slumps or rotational slides were observed as well.
- History of debris flows in the drainages of the E. and W. Fork of the Wallowa River.
- A significant debris flow slide occurred in 2006 on the west slope across the East Fork Wallowa River. The debris flow slide occurred on the opposite side of the river from the penstock, and the event deposited a significant amount of debris and sediment that temporarily dammed the river.
- Based on the steeper slopes and thinner soil and vegetation cover, the western slopes above the East Fork Wallowa River appear more susceptible to debris flows than the eastern slopes; therefore, the penstock and access road are less vulnerable to this type of slide event.

Geology and Soils Study (continued)





Geology and Soils Study (continued)

Slope Stability (cuts and fills) and Erosion Concerns:

- Localized areas of minor sloughing associated with cut and side cast construction techniques along the access road were observed during the site reconnaissance.
- These areas do not pose an immediate risk to the penstock; however, they will likely continue to be an access road maintenance issue.

Other Hazards:

- The only penstock failure and subsequent uncontrolled discharge of water due to natural hazards was the result of a tree fall event.
- Hazard trees (near trestle locations and the Royal Purple Creek diversion flowline).



Geology and Soils Study (continued)

Additional Work Proposed :

- No study modifications are proposed at this time.
- Continue erosion control practices and vegetation management throughout the project area.
- Assess the tree conditions and remove any trees along the penstock alignment and the Royal Purple Creek diversion flowline that represents a hazard.
- Continue to monitor the access road and cut and fill slopes along the penstock alignment paying particular attention to the Royal Purple Creek drainage area and the segment between the dam and where the penstock is located on the west side (down slope) of the access road (approximate Stations 0+00 to 17+50).

Terrestrial Resources

Kendel Emmerson
Terrestrial Scientist
PacifiCorp



Special Status Plant Study

Objectives: To identify and map populations of special status plants within the Study Area. Special status plants include any plants that are on the following lists:

- United States Fish and Wildlife Service (USFWS) status that is Listed Endangered, Listed Threatened, Proposed Endangered, Proposed Threatened, Candidate, Species of Concern, and Partial Status
- Oregon Department of Agriculture status that is Listed Endangered, Listed Threatened, Proposed Endangered, Proposed Threatened, and Candidate
- Oregon Biodiversity Information Center (ORBIC) List 1 or 2
- Regional Forester's Special Status Species Lists for Sensitive Non-Vascular and Vascular plants on the Wallowa-Whitman National Forest
- Wallowa-Whitman National Forest Strategic Plant Species List

Study Area: All lands owned by PacifiCorp or USFS that are within 100-meters of a PacifiCorp facility.



Special Status Plant Study

Methods:

- Pre-field review to update current special status plant lists and evaluate any existing data.
- Conduct field surveys using an intuitive-controlled methodology as described in Whiteaker et al. 1998.
- Survey results documented using USFS guidelines and standards.

Field Work Conducted to Date and Study Status:

- Pre-field review was completed May 30.
- Field surveys were completed June 13 and July 31.
- Documentation completed August 20.

Variance to Study Plan: No variances from the study plan have occurred to date.



Special Status Plant Study

Discussion Points:

- No special status plant species were observed
- Field data collected is sufficient to meet study objectives.
- Because no special status plant species were detected within the study area, it is assumed that project operations and routing maintenance have no effect on special status plant species.

Additional Work Proposed:

- No additional field work or study modifications are proposed at this time.
- A summary of results to date is available in the Study Progress report.
- Final results and recommendations will be presented in the Final Technical Report June 2013.



Noxious Weed Study

Objectives: To identify and map noxious weed populations on lands and aquatic areas within the Study Area.

Study Area: All lands owned by PacifiCorp or USFS that are within 100-meters of a PacifiCorp facility.

Methods:

- Update current state and county noxious weed lists
- Evaluate any existing data on known noxious weed locations within the Study Area
- Produce a map of high, medium, and low potential noxious weed areas within the Study Area
- Conduct field surveys simultaneously with special status plant surveys using the same intuitive-controlled methodology
- Develop map of existing noxious weed locations and document results



Noxious Weed Study

Field Work Conducted to Date and Study Status:

- Pre-field review was completed May 30.
- Field surveys were completed June 13 and July 31.
- Maps and documentation were completed August 20.

Variance to Study Plan: To date no variances from the study plan have occurred.

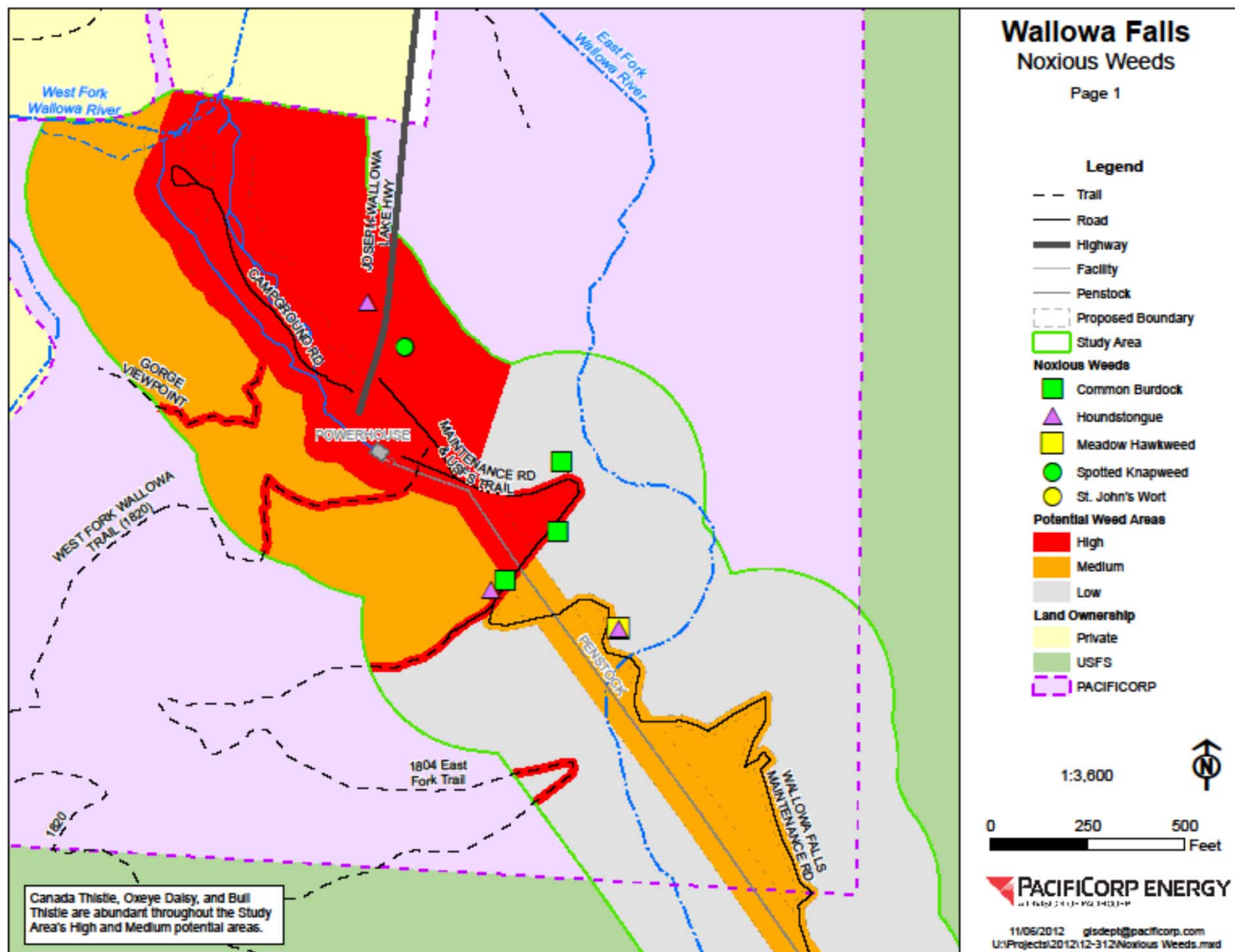
Discussion Points: Populations of noxious weeds were located within the project area. The field data collected is sufficient to meet study objectives.

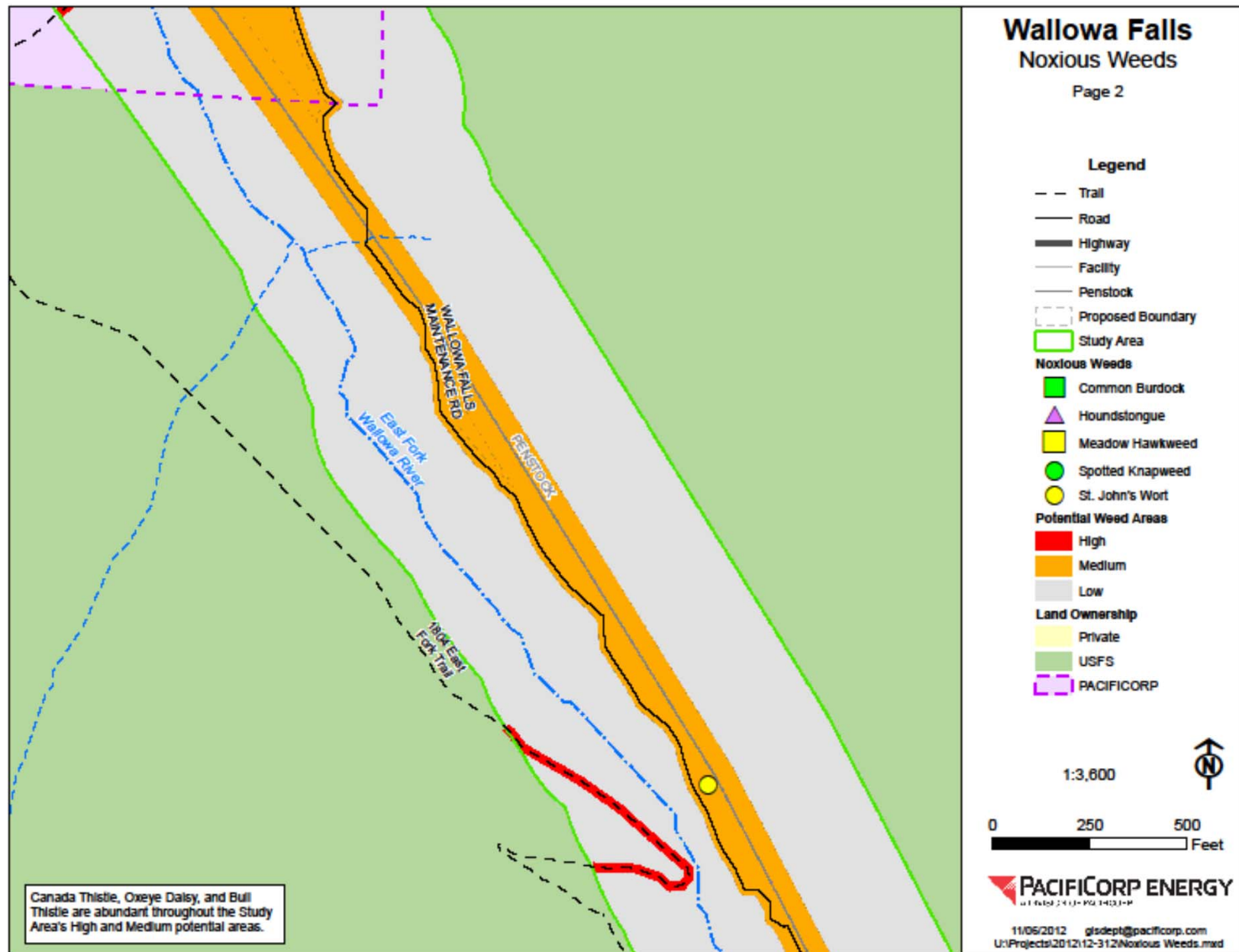


Noxious Weed Study

Additional Work Proposed:

- No additional field work or study modifications are proposed at this time.
- A summary of results is available in the Study Progress report.
- Results and recommendations will be presented in the Final Technical Report in June 2013.





Wallowa Falls Noxious Weeds

Page 3

Legend

- Trail
- Road
- Highway
- Facility
- Penstock
- - - Proposed Boundary
- Study Area
- Noxious Weeds**
 - Common Burdock
 - Houndstongue
 - Meadow Hawkweed
 - Spotted Knapweed
 - St. John's Wort
- Potential Weed Areas**
 - High
 - Medium
 - Low
- Land Ownership**
 - Private
 - USFS
 - PACIFICORP

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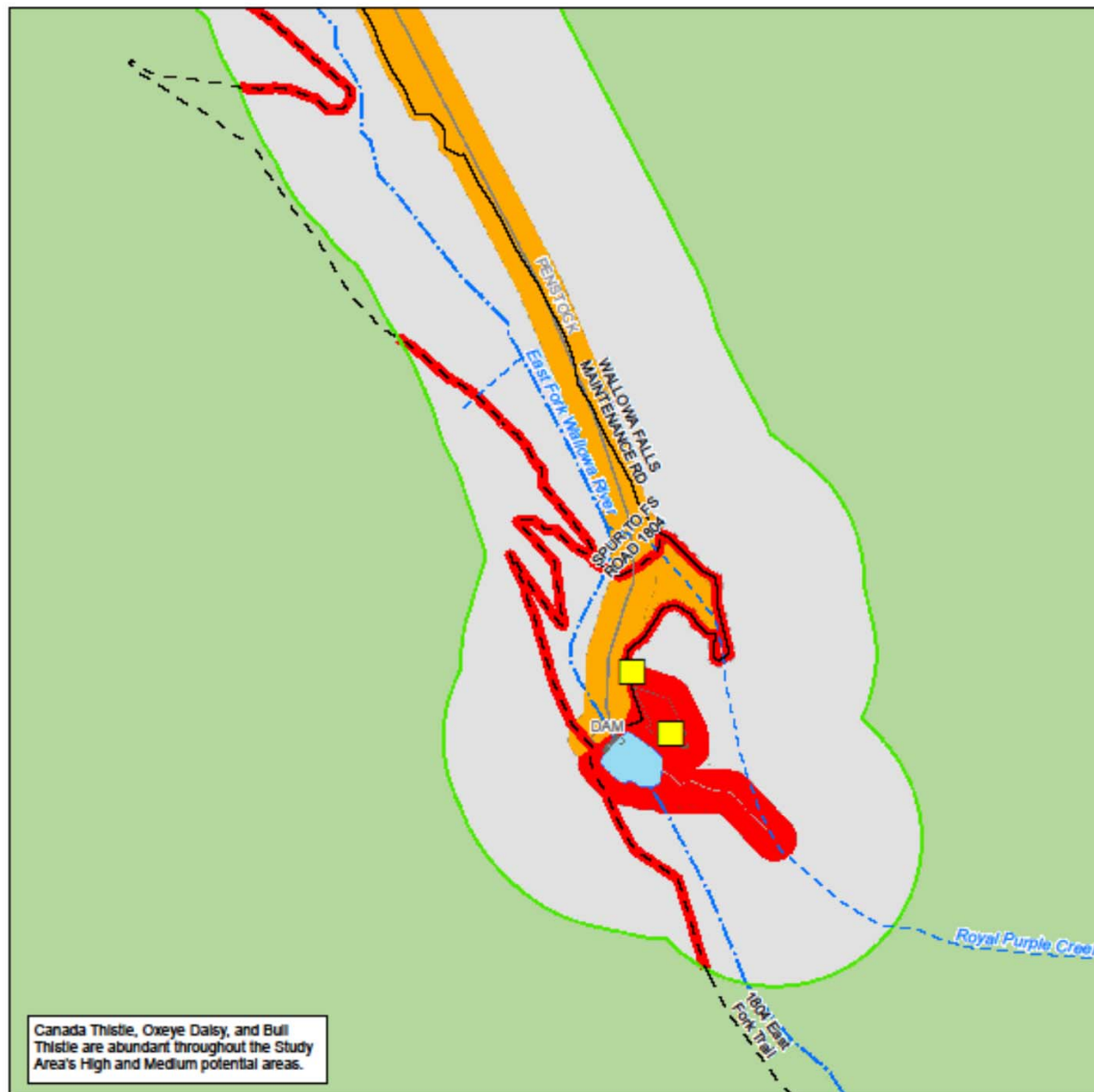


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Feet

PACIFICORP ENERGY
a subsidiary of PacifiCorp

11/05/2012 glsdept@pacificorp.com
U:\Projects\2012\12-312\Noxious Weeds.mxd

Canada Thistle, Oxeye Daisy, and Bull Thistle are abundant throughout the Study Area's High and Medium potential areas.





Riparian and Wetland Study

Objectives:

- To identify and map the estimated boundary of wetlands and ordinary high water mark for rivers and streams within the Study Area.
- Describe the existing riparian and wetland habitat location, extent, and conditions.
- Assess the Project's operational effects on the riparian and wetland function in the Study Area.
- Identify any potential management measures or opportunities to protect and improve wetland or riparian habitat conditions.

Study Area: All lands and aquatic areas that are owned by PacifiCorp or USFS that are within 100-meters of a Project facility.



Riparian and Wetland Study

Methods:

- Pre-field review of information (topography, existing GIS datasets)
- Field surveys for wetlands and riparian areas were conducted simultaneously.
- Riparian and wetland perimeters were determined by the obvious signs of hydrology, vegetation, and soil indicators.

Field Work Conducted to Date and Study Status:

- Field surveys were completed between July 3-5.

Variance to Study Plan:

- Most of the East Fork Wallowa River banks within the Study Area are inaccessible, so points were collected where accessible and then corrected, as needed, on aerial imagery.



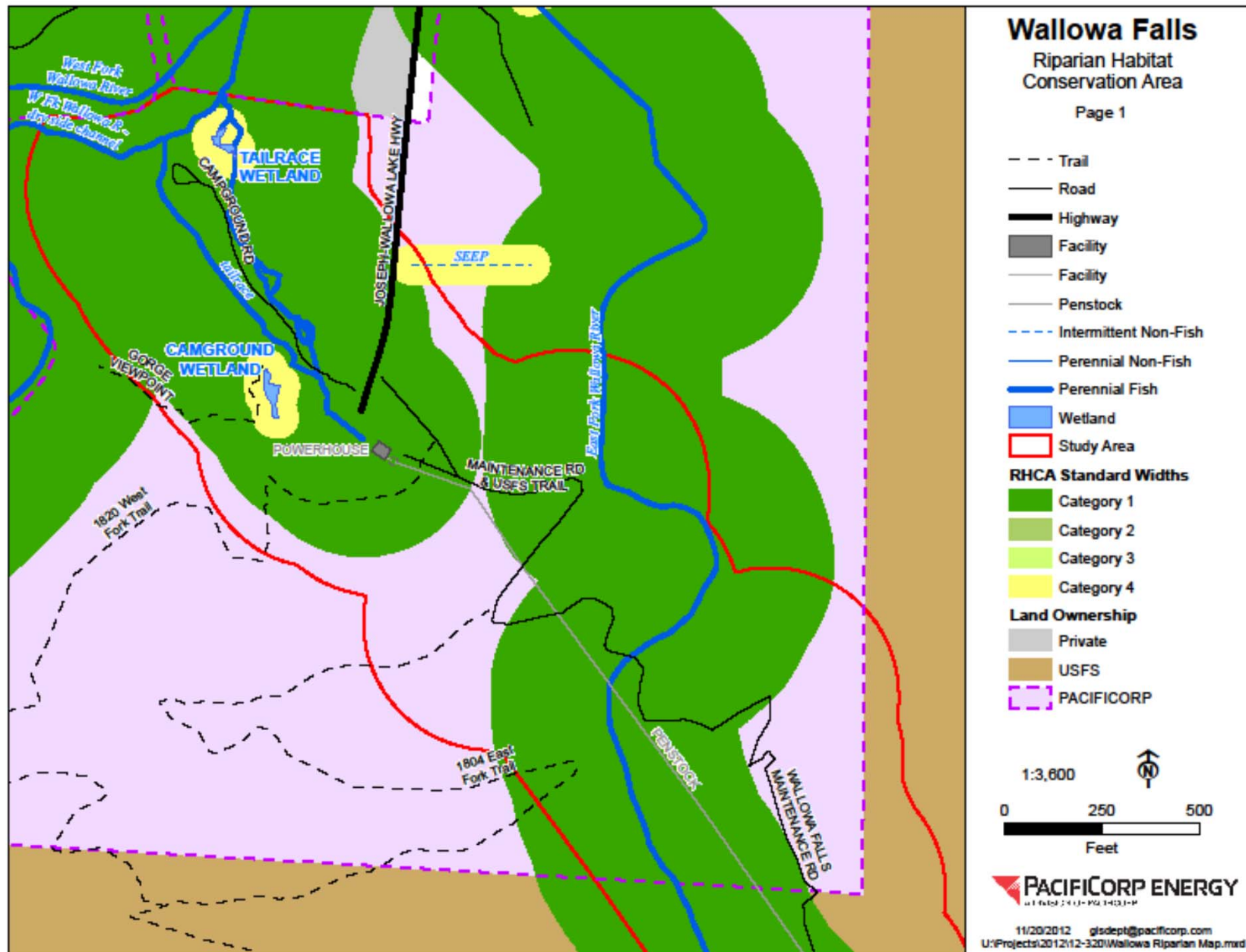
Riparian and Wetland Study

Discussion Points:

- A few small wetlands and tributaries were located and mapped.
- The field data collected is sufficient to meet study objectives.

Additional Work Proposed:

- No additional field work or study modifications are proposed at this time.
- A summary of results to date is available in the Study Progress report.
- Final results and recommendations will be presented in the Final Technical Report in June 2013.





Vegetation Cover Study

Objectives:

- To identify and classify vegetation cover types within the Study Area.

Study Area: All lands owned by PacifiCorp or USFS that are within 100-meters of a Project facility.

Methods:

- Produce a map that delineates the distinct plant communities into vegetation cover type polygons using aerial imagery, topography, streams, roads, and existing GIS datasets
- Conduct field surveys to ground-truth and correct the vegetation cover type boundaries and to determine appropriate plant association group (PAG) for each polygon.

Field Work Conducted to Date and Study Status:

- Field surveys were conducted between June 12-14 and July 3-5.



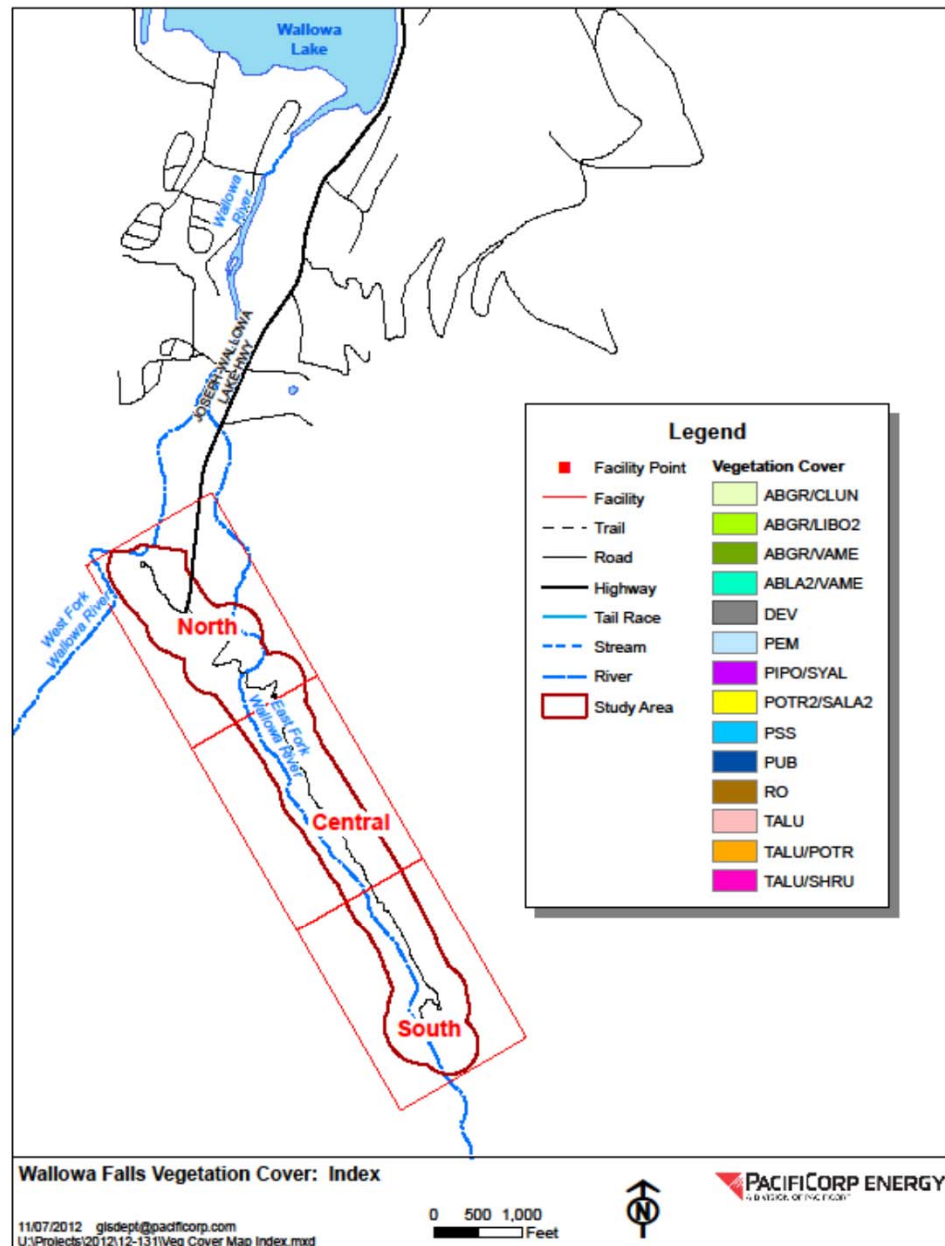
Vegetation Cover Study

Variance to Study Plan:

- Several areas were inaccessible and had to be assessed from vantage points.
- Because there are no PAG that accurately described the talus slopes, three PAGs had to be created to capture this information. Talus slopes were divided into 3 categories Talus (TALU) for areas that were bare rock with less than 25% vegetation cover, Talus-shrub (TALU-SHRU) are talus slopes with mixed shrub cover that is $\geq 25\%$, and talus slopes that had quacking aspen tree (*Populus tremuloides*) cover that is $\geq 25\%$ as Talus/Aspen (TALU-POTR).

Discussion Points:

- Major vegetation cover types included grand fir and subalpine fir series, talus slopes, and rock outcrops. The field data collected is sufficient to meet study objectives.



Plant Association Group Types and Acres within the Study Area.

PAG Name	PAG Code	Number of Acres within the Study Area	Total Percent of the of Study Area
Black Cottonwood/Pacific willow	POTR ₂ /SALA ₂	1.35	1.07
Developed	DEV	1.58	1.25
Grand Fir/ Queen's Cup	ABGR/CLUN	1.75	1.38
Grand Fir/Twinflower	ABGR/LIBO ₂	15.24	12.05
Grand Fir/Big Huckleberry	ABGR/VAME	59.73	47.22
Palustrine Emergent	PEM	0.11	0.09
Palustrine Scrub Shrub	PSS	0.34	0.27
Palustrine Unconsolidated Bottom	PUB	0.28	0.22
Ponderosa Pine/Common Snowberry	PIPO/SYAL	1.03	0.81
Rock Outcrop	RO	1.55	1.23
Subalpine Fir/Big Huckleberry	ABLA ₂ /VAME	18.24	14.42
Talus	TALU	9.78	7.73
Talus/Aspen	TALU/POTR	7.74	6.12
Talus/Shrubland	TALU/SHRU	7.78	6.15
Total		126.50	



Vegetation Cover Study

Additional Work Proposed:

- No additional field work or study modifications are proposed at this time.
- A summary of results to date is available in the Study Progress report.
- Final results and recommendations will be presented in the Final Technical Report in June 2013.



Wildlife Study

Objectives:

- To document baseline information on the occurrence, distributions, and relative abundance of terrestrial species and with special emphasis on the following species:
 - USFWS status that is Listed Endangered, Listed Threatened, Proposed Endangered, Proposed Threatened, Candidate, Species of Concern, and Partial Status
 - Oregon Department of Fish and Wildlife List of Threatened, Endangered and Sensitive Species ORBIC List 1 or 2
 - Regional Forester's Special Status Species Lists for Sensitive Vertebrates and Federally Threatened, Endangered, and Proposed (TE&P)
 - Management Indicator Species for the Wallowa Whitman National Forest

Study Area: All lands and aquatic areas that are owned by PacifiCorp or USFS and are within 100-meters of a Project facility.



Wildlife Study

Methods:

- Update current special status wildlife species lists
- Evaluate any existing data
- Conduct field surveys to document wildlife observations
- Conduct dip net surveys to document amphibian use in the Study Area.

Field Work Conducted to Date and Study Status:

- Field surveys were completed during the May 15-16 and August 21-22 and anecdotally while conducting other field studies.

Variance to Study Plan: No variances from the study plan have occurred to date.



Wildlife Study

Discussion Points:

- Surveys confirmed the presence of the known sensitive species and determined the presence of the Rocky Mountain tailed frog (*Ascaphus montanus*) in the waters upstream of the fore bay.
- The two State Sensitive Vulnerable avian species which were detected within the Study Area, the Olive-sided flycatcher and pileated woodpecker, are not likely to be affected by project operations.
- The field data collected is sufficient to meet study objectives.

Additional Work Proposed:

- No additional field work or study modifications are proposed at this time.
- A summary of results to date is presented in the Study Progress report.
- Final results and recommendations will be presented in the Final Technical Report in June 2013.

Water Resources

Ken Carlson
Water Resources Scientist
CH₂M Hill



Water Resources Study

Objectives:

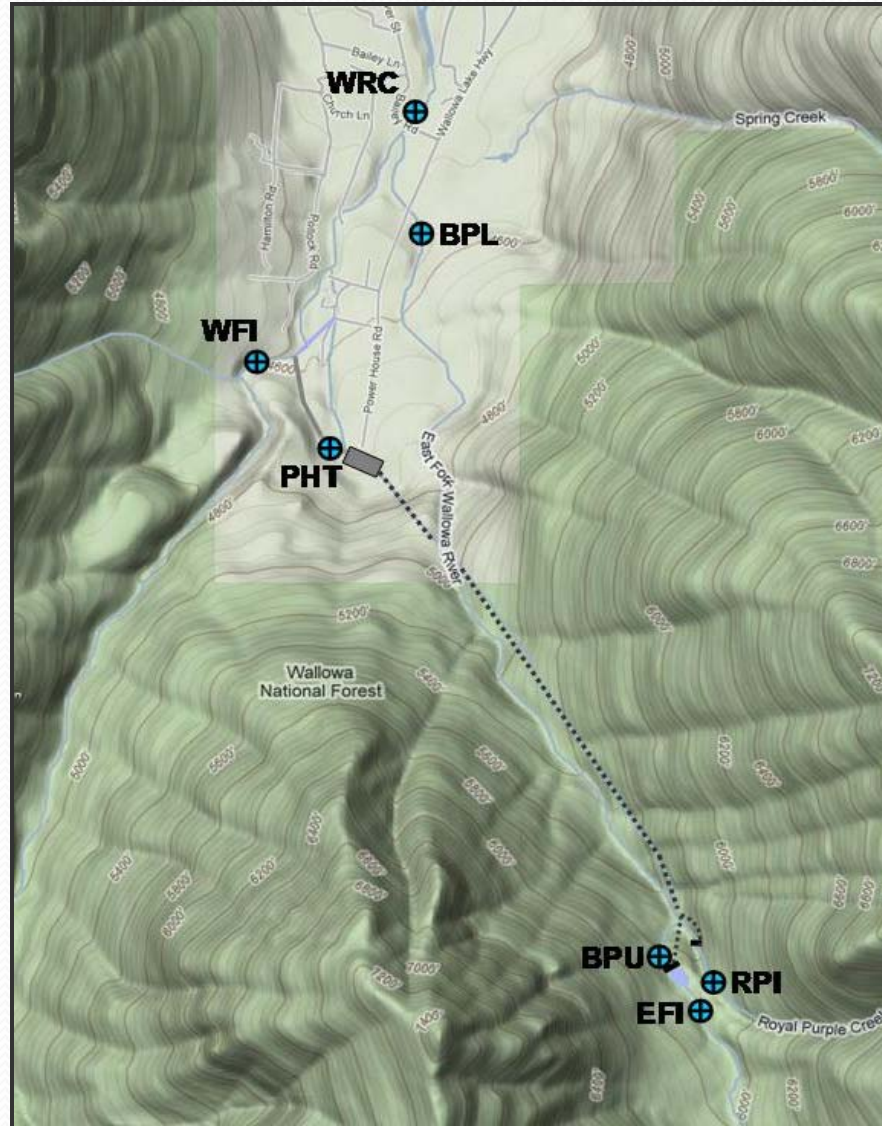
- Characterize and assess hydrology in the Project area
- Monitor and evaluate key water quality parameters in the Project area

Study Area: Includes the following waters:

- East Fork Wallowa River and Royal Purple Creek inflows
- East Fork Wallowa River bypass reach
- Project tailrace
- West Fork Wallowa River into which tailrace waters discharge

Data Collection Activities:

- Five key parameters: flow, temperature, DO, TDG, and turbidity
 - Other parameters unnecessary because they are not a concern in this pristine watershed and have no specific nexus to Project operations





Water Resources Study

Status of Data Collection Activities:

- **Flow:** continuous sampling all year (EFI, BPU, BPL, and PHT)
 - *STATUS: Completed per plan for 2012*
- **Water temperature:** continuous sampling all year (All Sites)
 - *STATUS: Completed per plan for 2012*
- **DO:** continuous sampling for 3-day periods in August, September, and October (EFI, BPU, and BPL)
 - *STATUS: Completed per plan for 2012*
- **TDG:** discrete (twice-daily) sampling for two-day periods each month from June-September (Site PHT)
 - *STATUS: Completed per plan for 2012*
- **Turbidity:** continuous sampling for multi-day period during forebay maintenance (Sites EFI, BPL, and PHT)
 - *STATUS: No routine forebay flushing in 2012. Therefore, no turbidity sampling in 2012.*



Water Resources Study

Variance to Study Plan:

- No routine forebay flushing in 2012. Therefore, no turbidity sampling.
- Other data collection activities related to forebay drawdown (as discussed next in Sediment Characterization).

Additional Work Proposed:

- No additional data collection in 2013 recommended at this time
- No other additional actions or adjustments needed for this study
- During 2013, water resources data analyses will be completed
 - Assessment of Project-related effects on water resources
 - Assessment of compliance with State water quality standards
 - Final results and recommendations for the Final Technical Report
 - Anticipated completion: June 2013



Water Resources Study

- The following slides provide highlights of results and analysis from 2012 data collection
 - Hydrology conditions
 - Water temperature
 - Dissolved oxygen
 - Total dissolved gas

Average Monthly Flows

Month	Average Monthly Flow (cfs) by Study Site				
	EFI	RPI	BPU	BPL	PHT
October	15.6	NA	3.8	NA	13.8
November	14.9	NA	1.9	NA	13.7
December	14.8	NA	1.6	21.1	12.3
January	12.2	NA	6.5	24.0	5.3
February	10.8	NA	3.2	10.8	8.6
March	10.0	NA	1.3	6.6	10.5
April	17.0	NA	5.6	11.1	10.7
May	30.3	0.8	16.4	22.4	12.6
June	51.9	1.0	36.9	47.6	12.8
July	41.5	2.1	33.2	33.7	9.6
August	16.7	2.0	11.1	9.9	9.0
September	13.9	2.2	9.8	8.4	7.6
Average	21.1	1.8	10.9	19.5	10.5

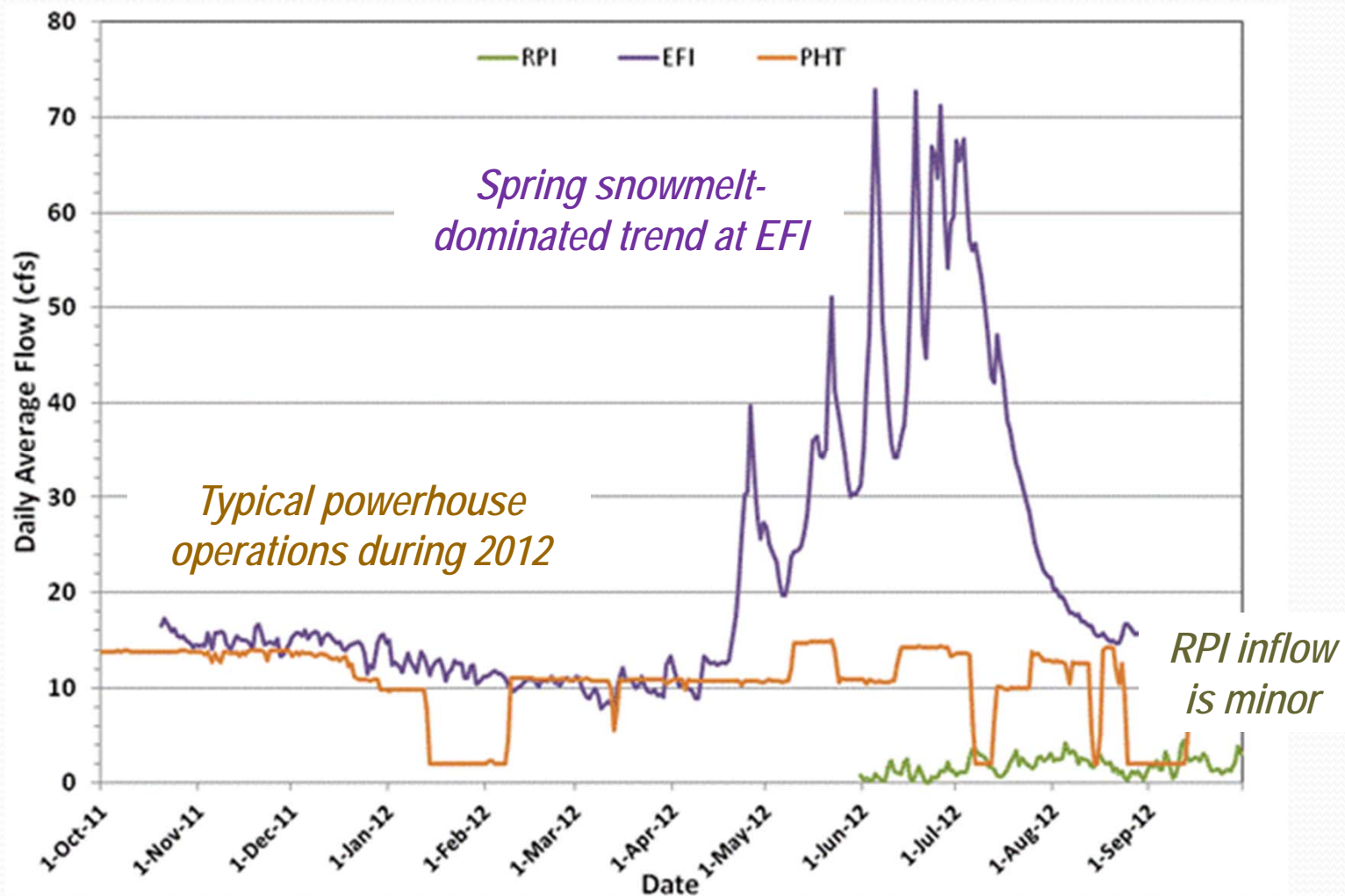
Past USGS gage data are being used to assess conditions relative to historic averages.

Winter flows were above historic averages (mostly at lower site)

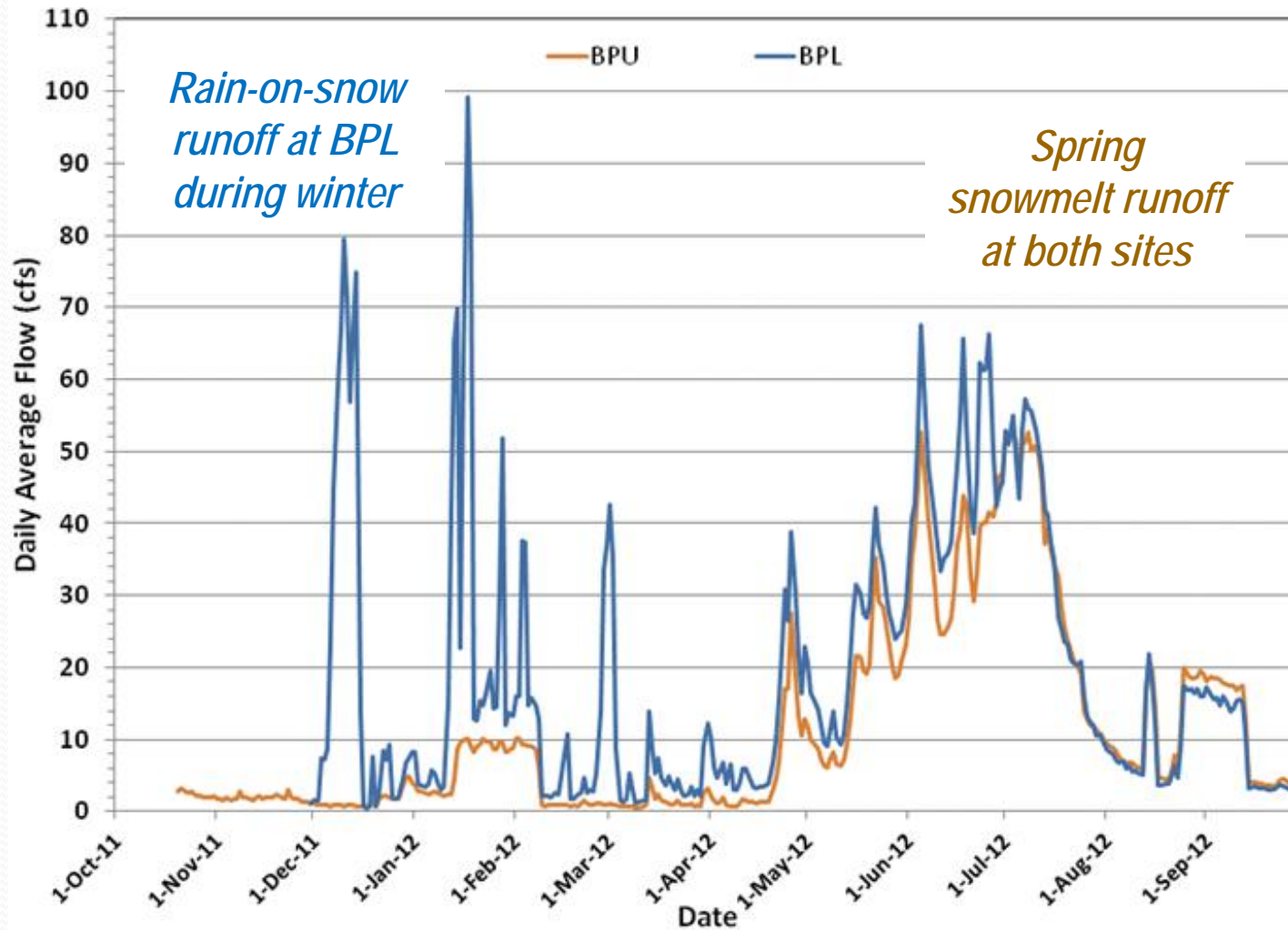
Late summer flows were slightly below historic averages

Overall 2012 averages are equal to historic averages

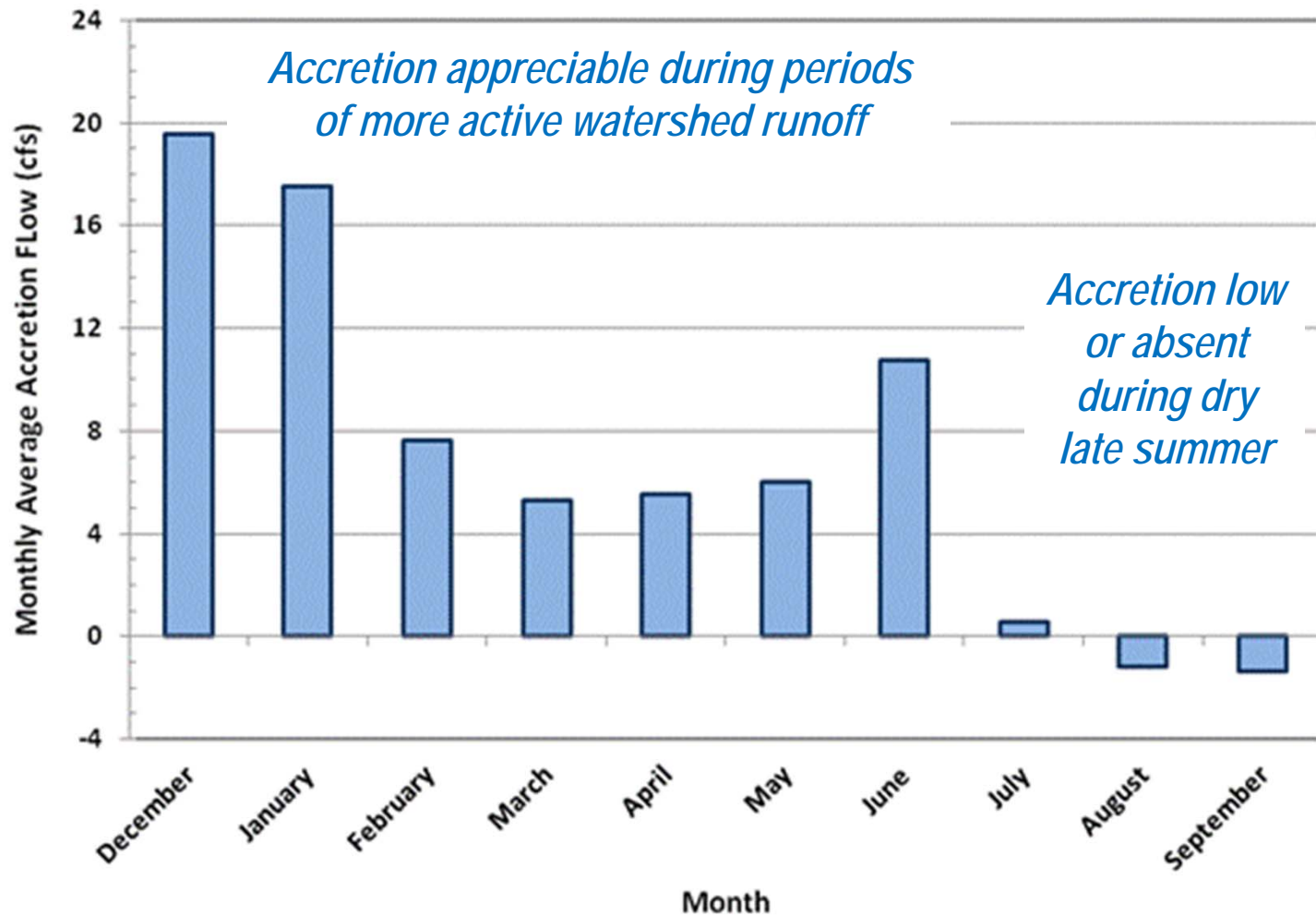
Hydrographs: EFI, RPI, & PHT



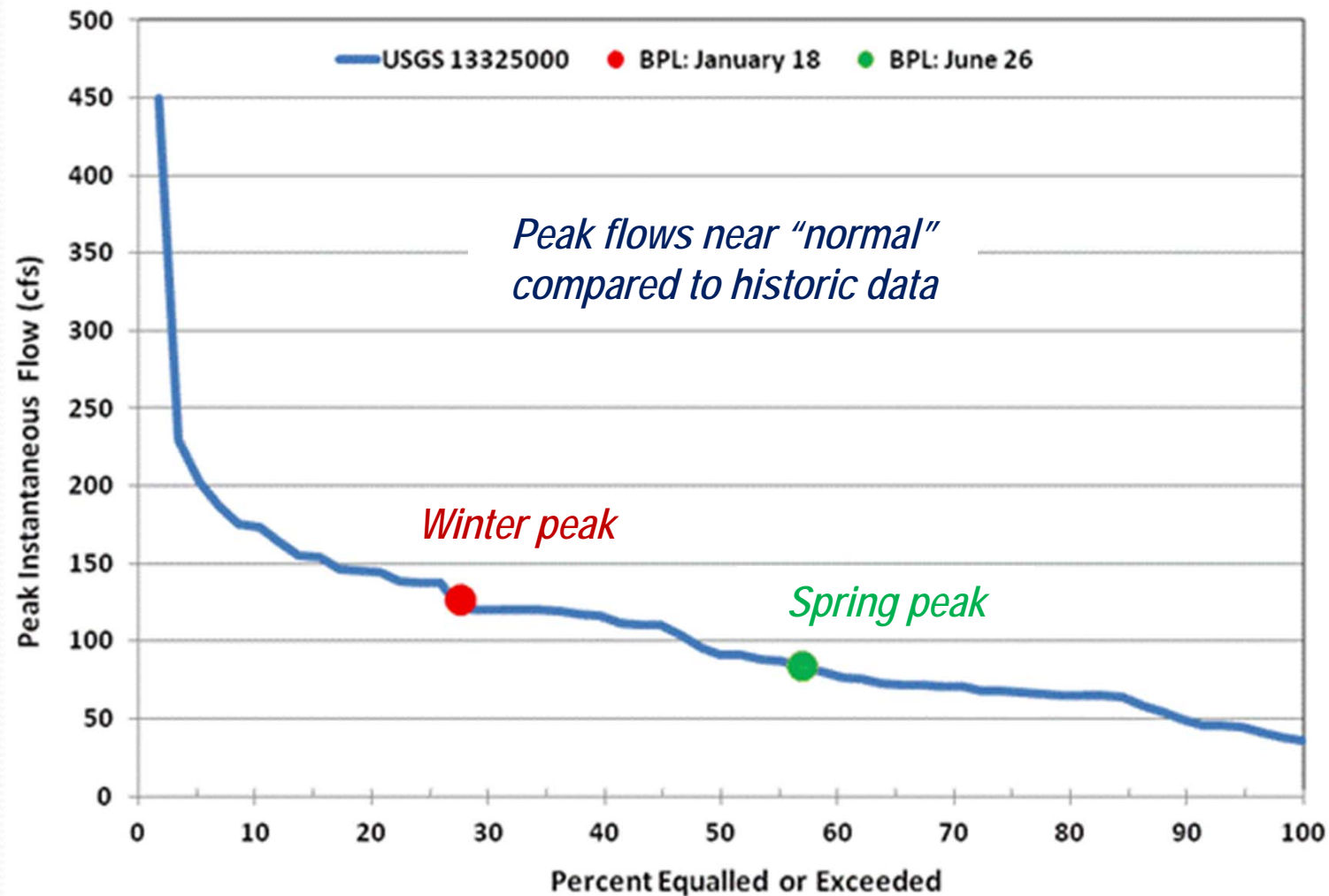
Hydrographs: BPU & BPL



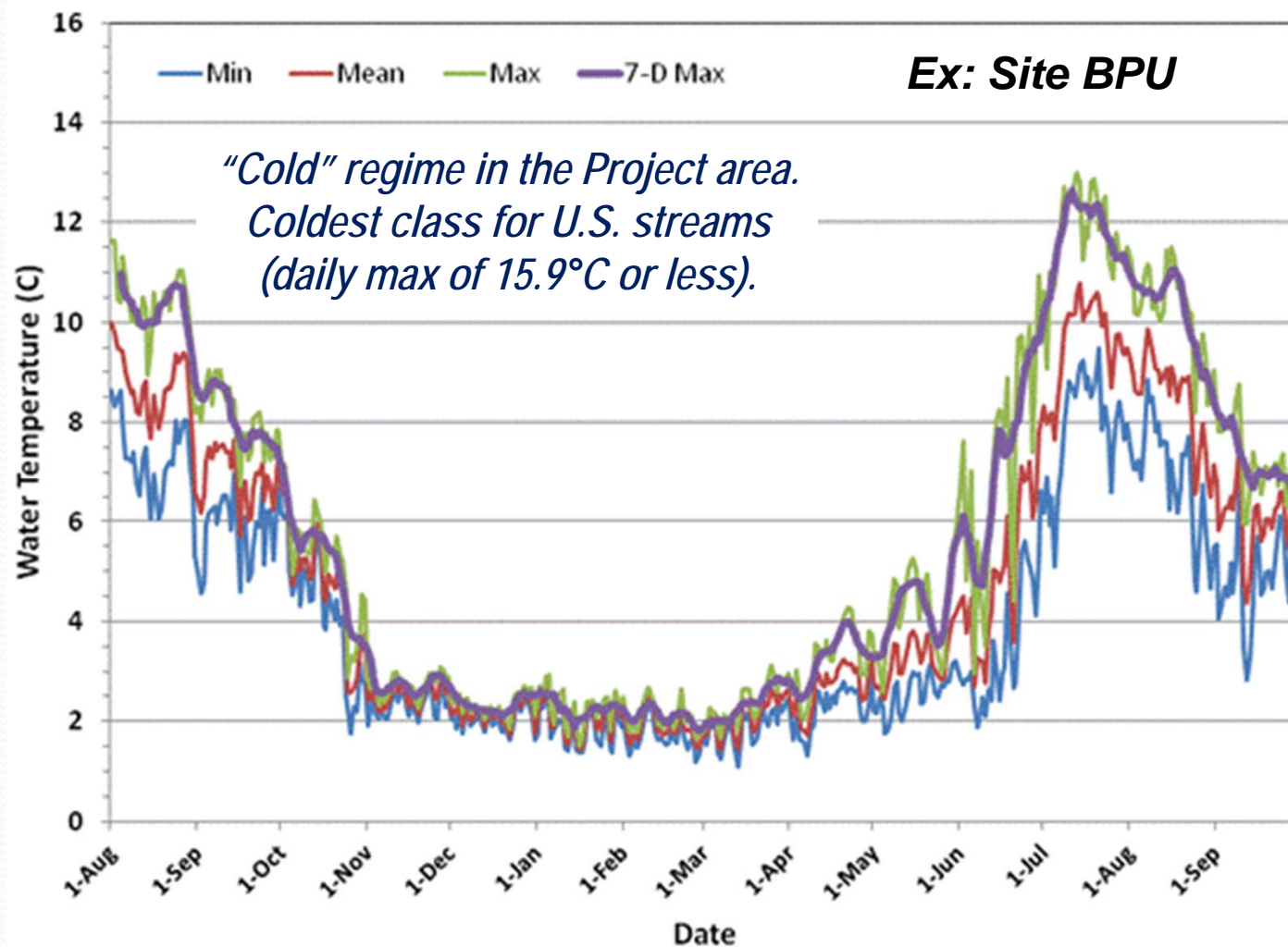
Accretion in Bypass Reach



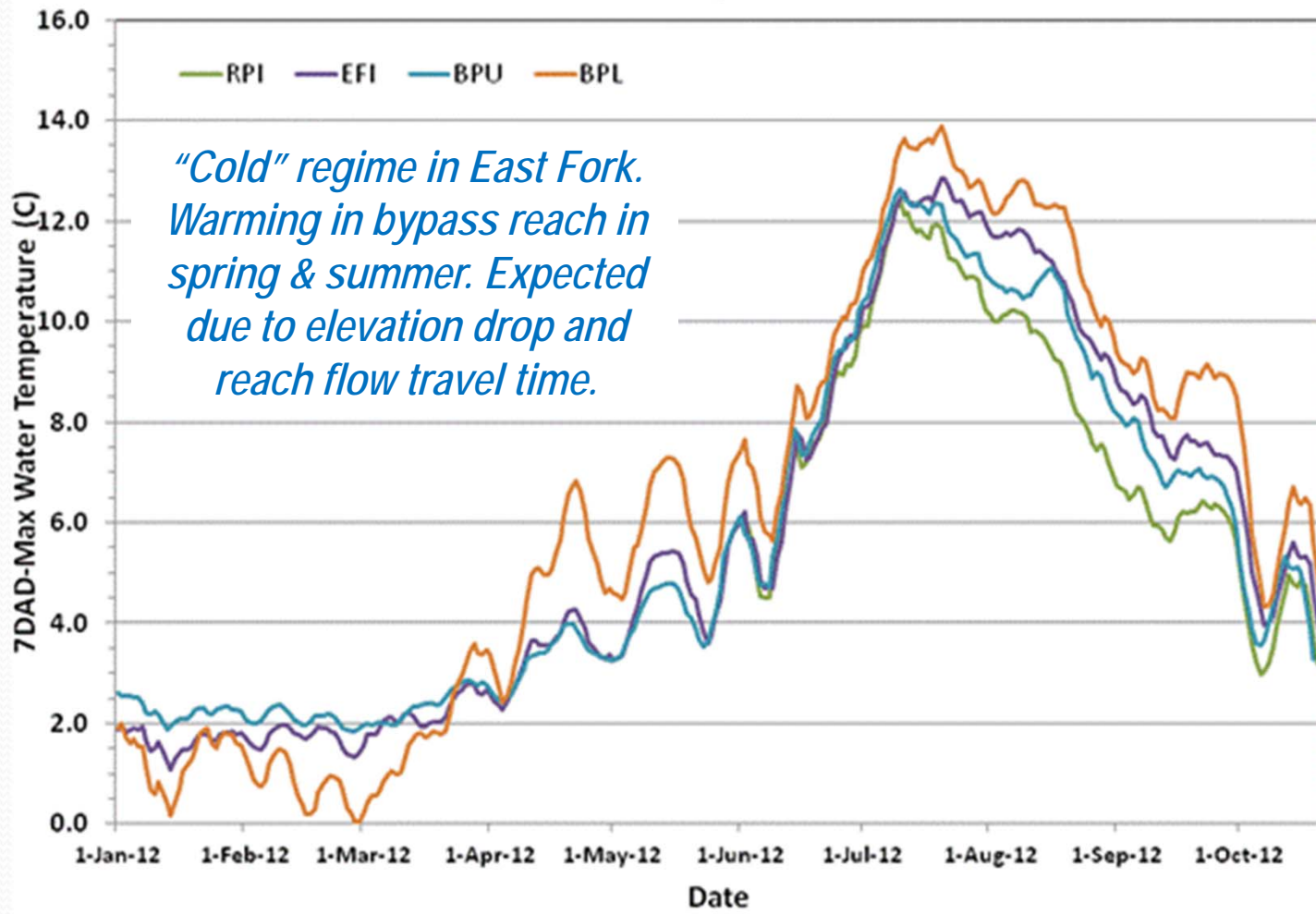
Peak Flows in Bypass Reach



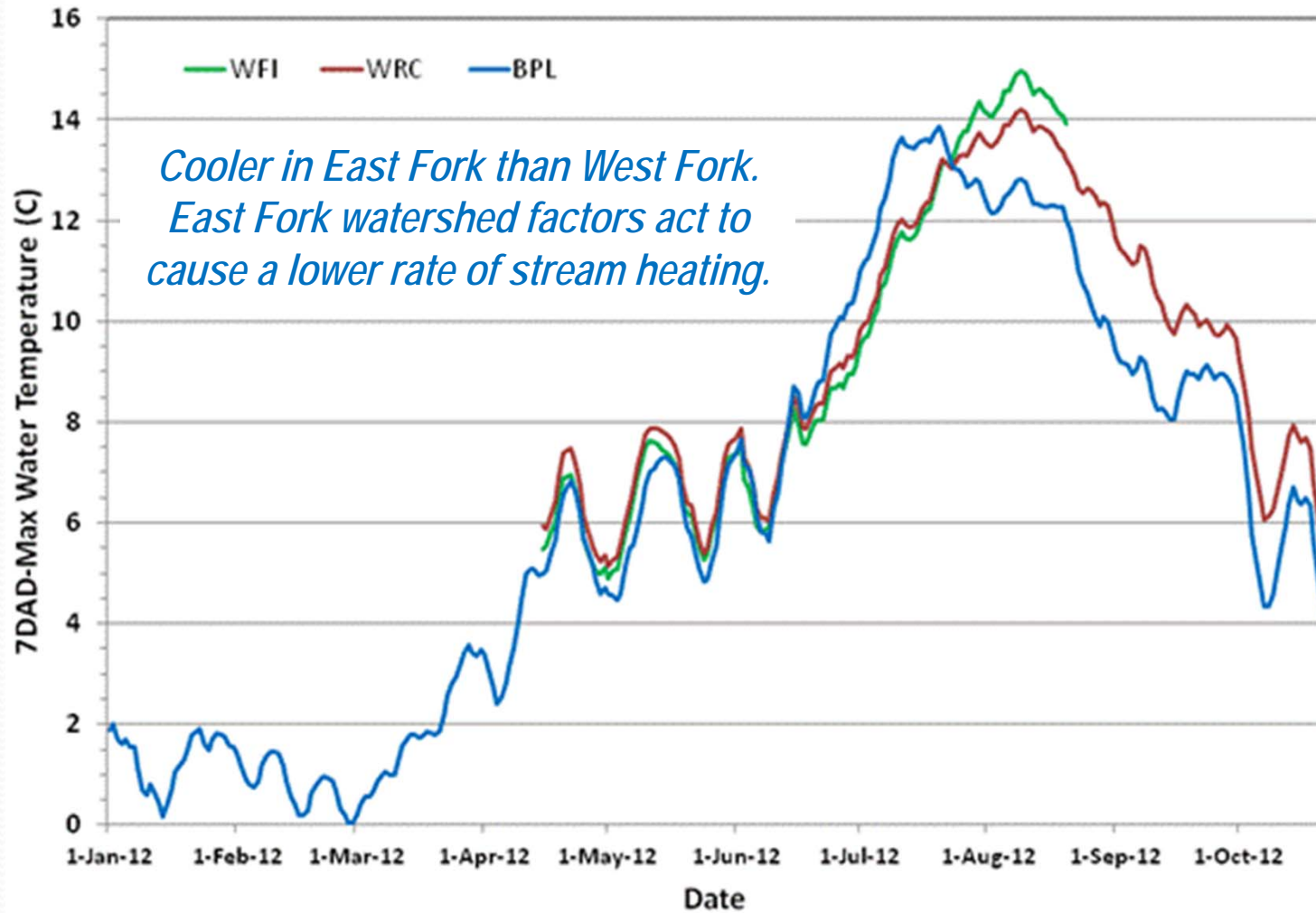
Water Temperature Regime



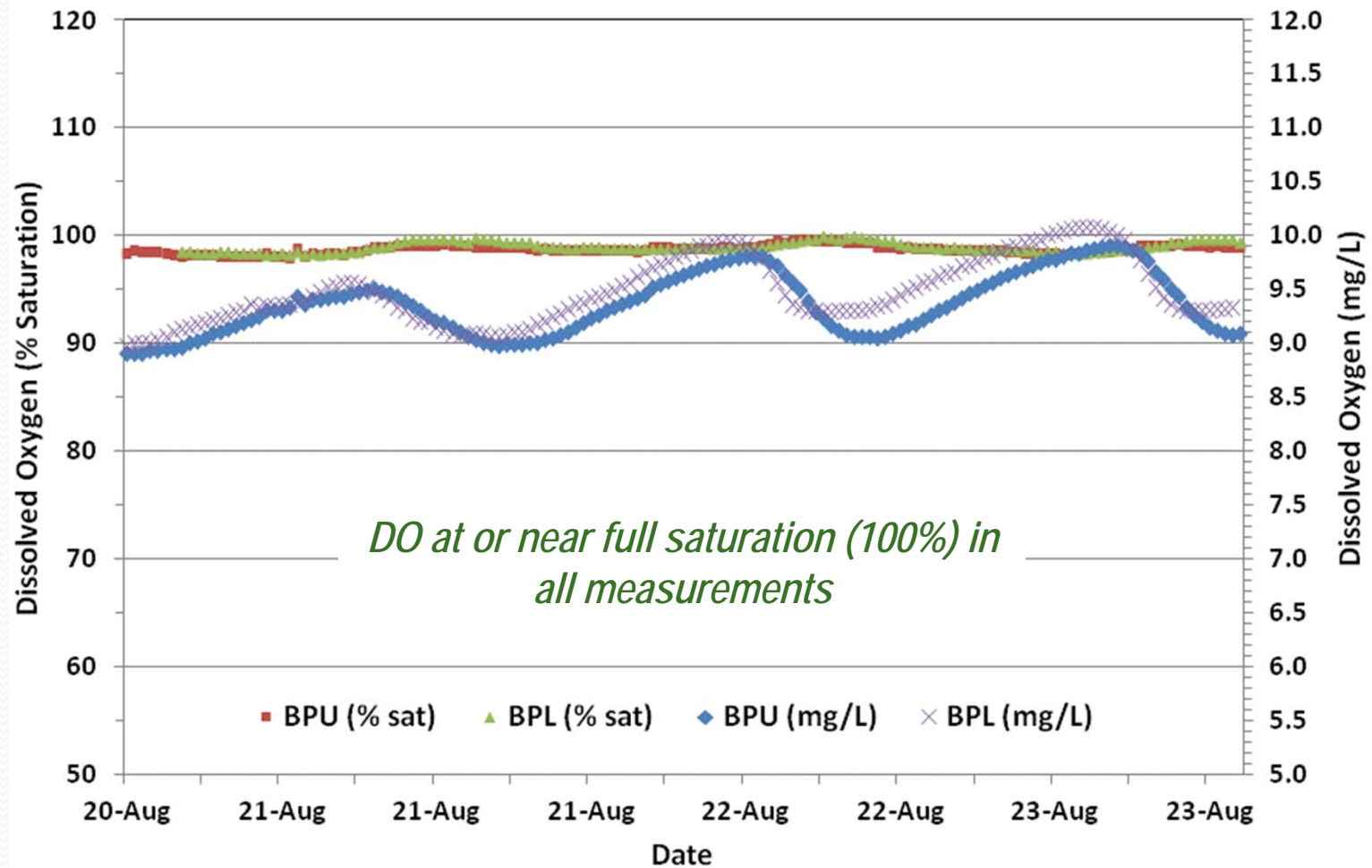
7DAD-Max: EFI, RPI, BPU & BPL



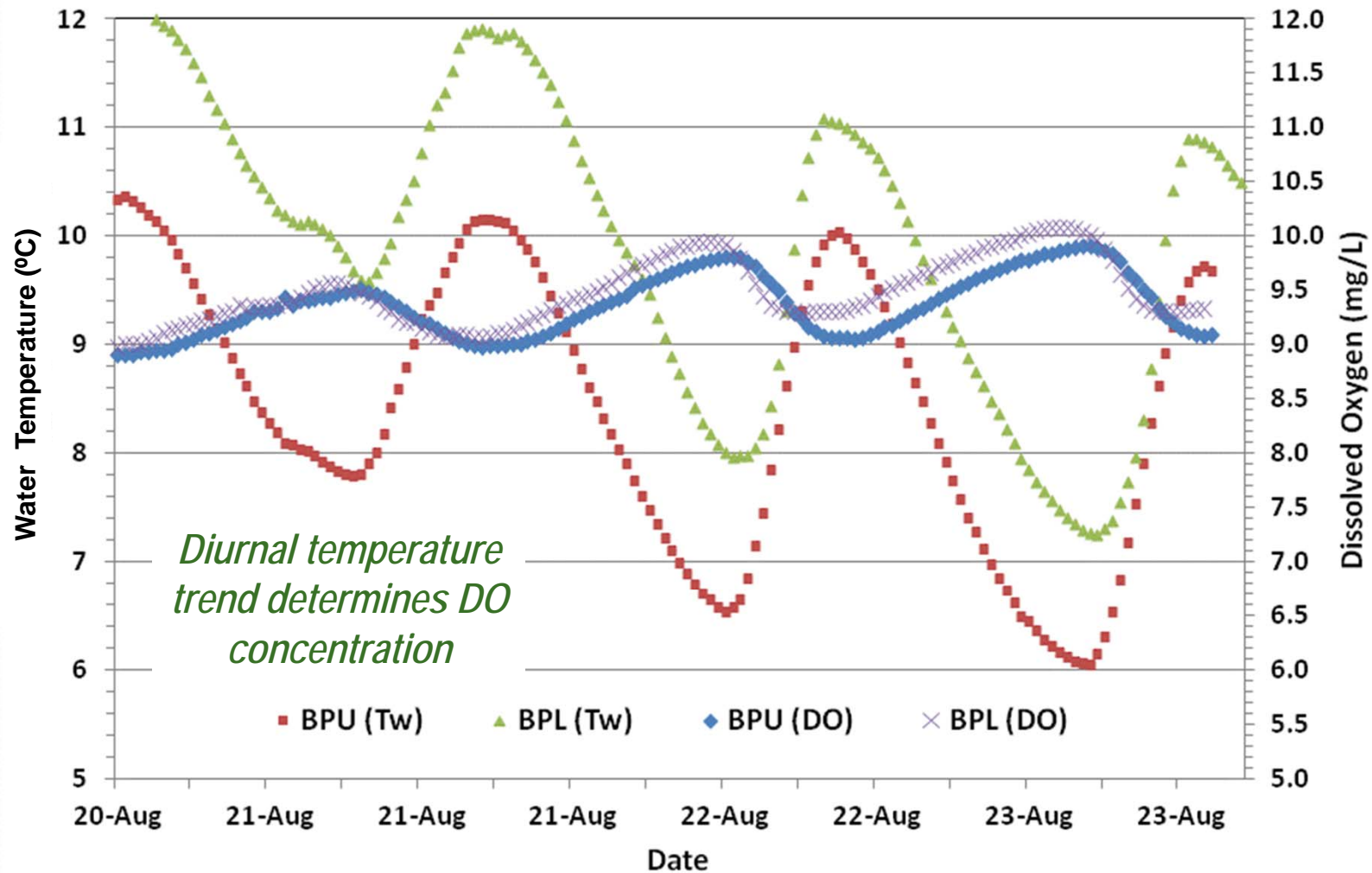
7DAD-Max: WFI, WRC, & BPL



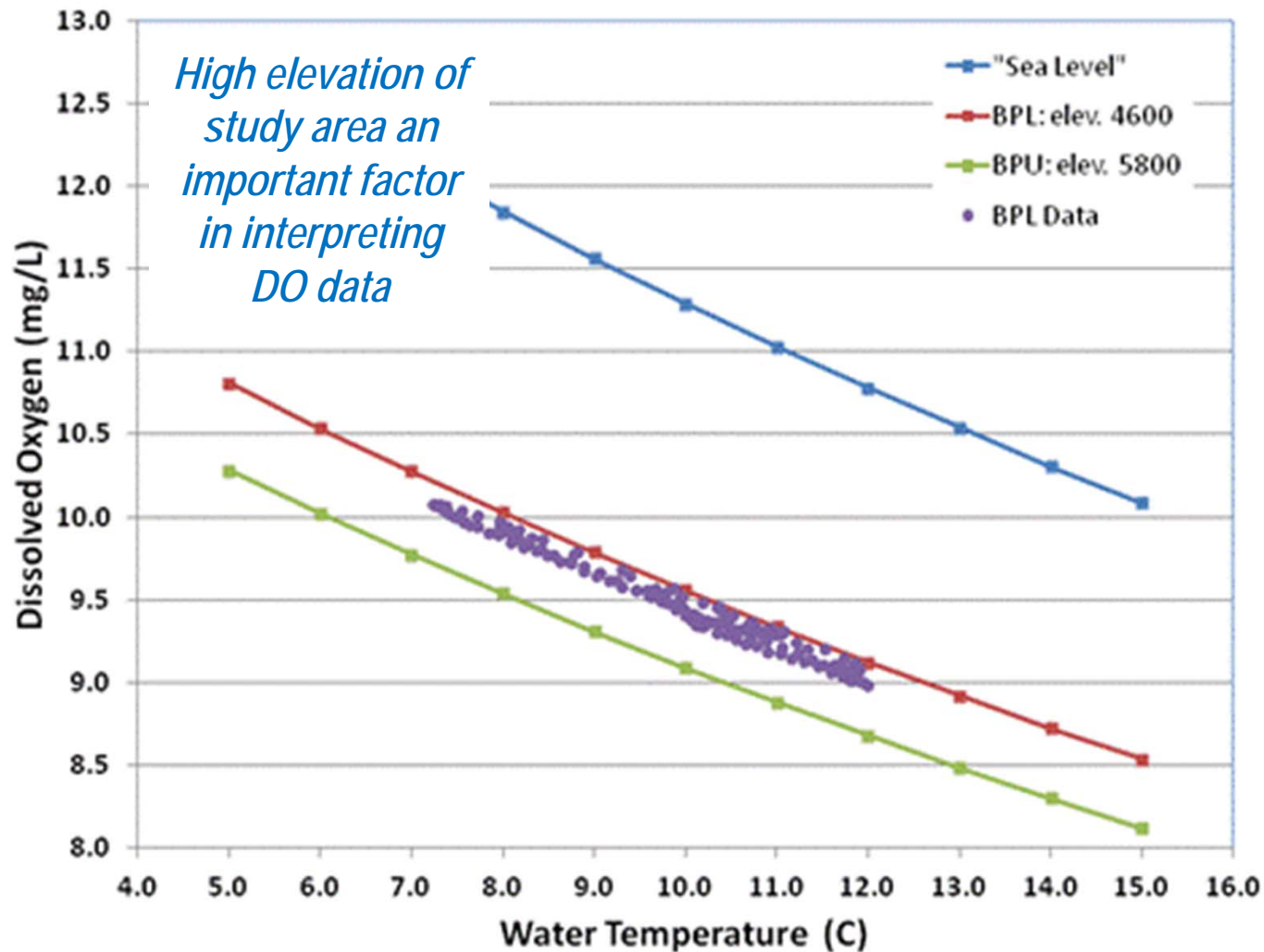
Dissolved Oxygen



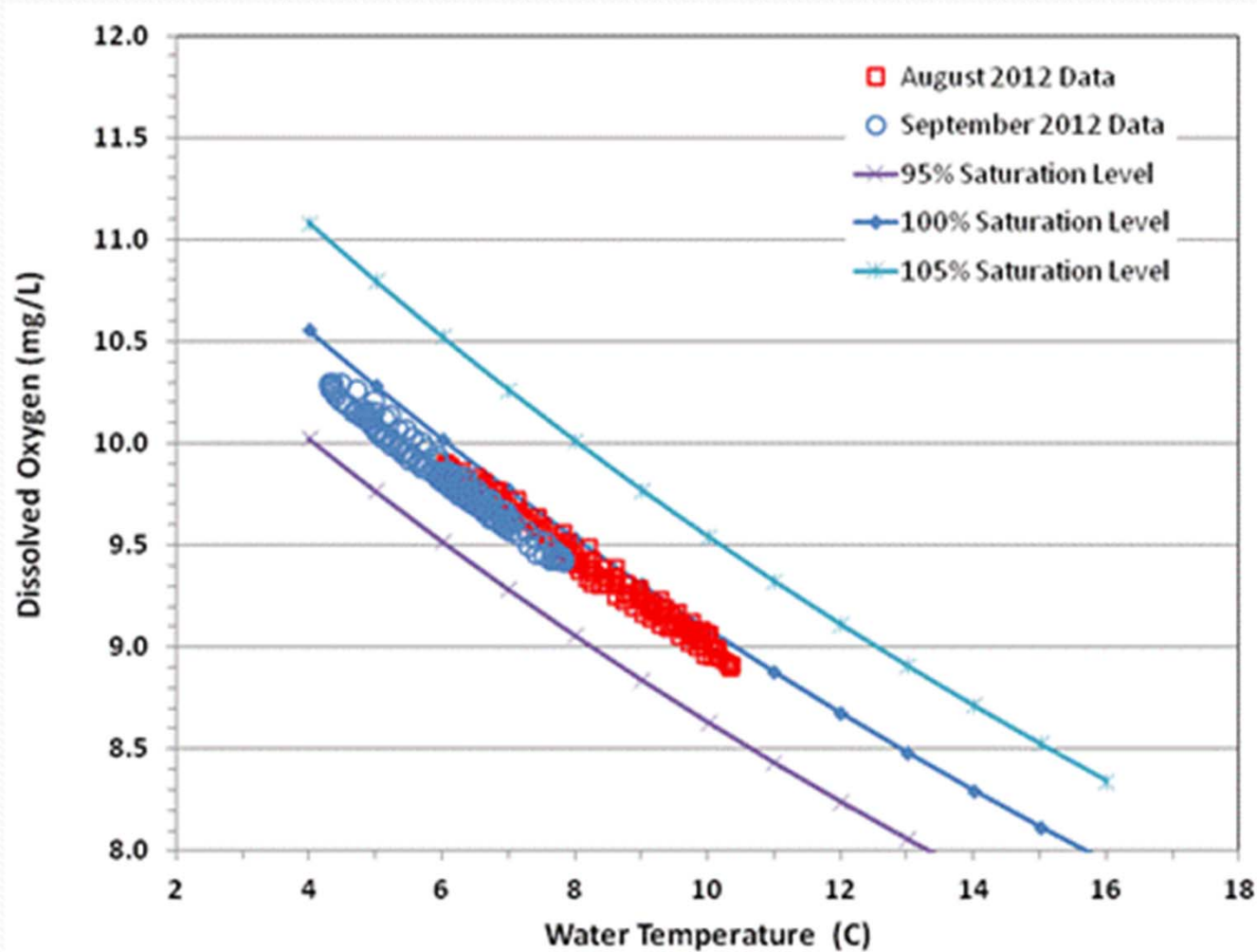
Dissolved Oxygen



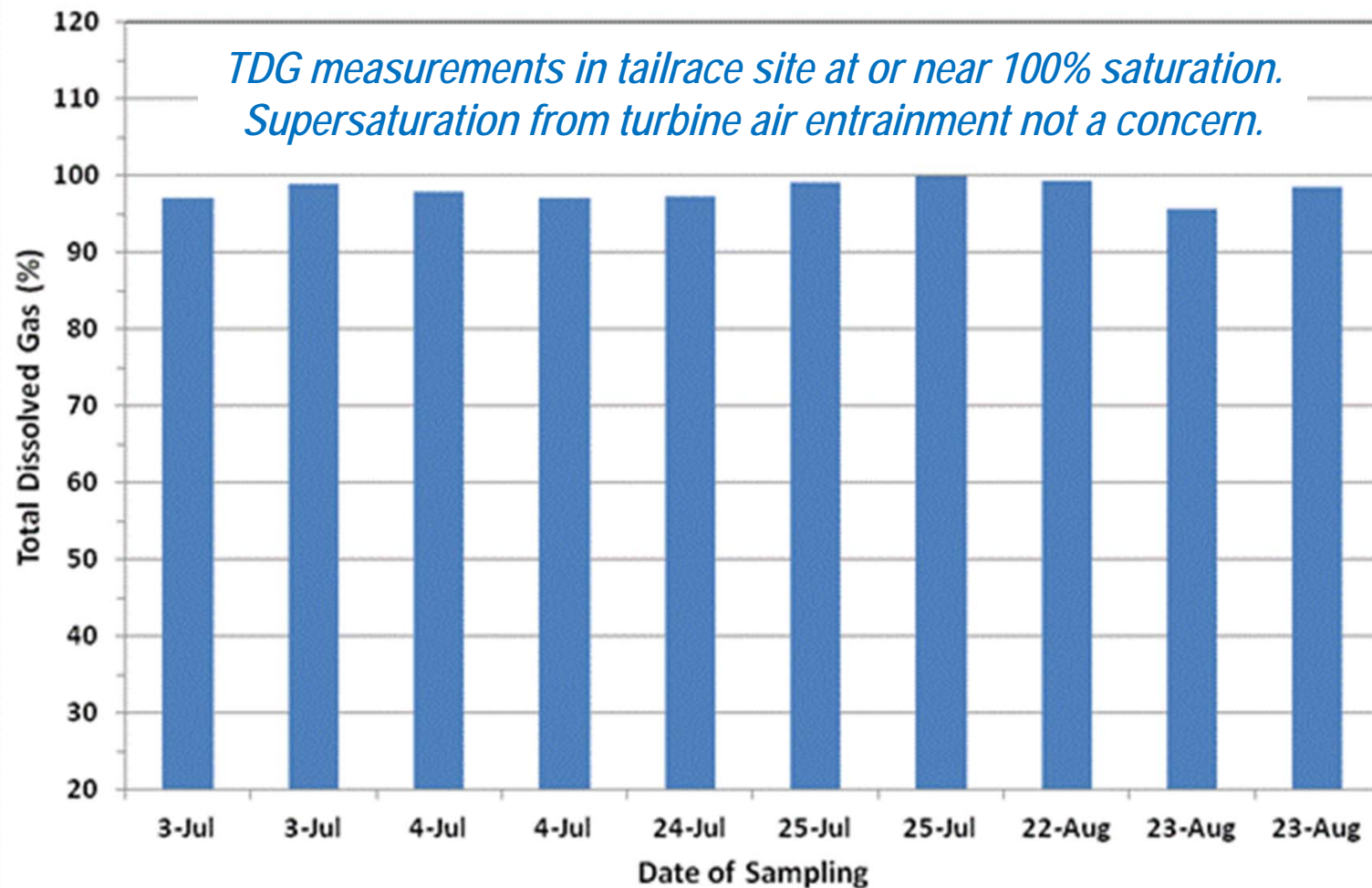
Saturation Levels & Elevation



2012 Data & Saturation Levels



TDG Measurements





Water Resources: Conclusions

- As expected, 2012 data confirmed that overall water quality is excellent, due to the relatively pristine location and characteristics of watershed area.
- No actions or adjustments regarding the Water Resources Study, including additional data collection in 2013, are recommended at this time.
- Final Technical Report (June 2013) will provide final results, analyses, and recommendations .

Sediment Characterization

Briana Weatherly
Environmental Analyst
PacifiCorp

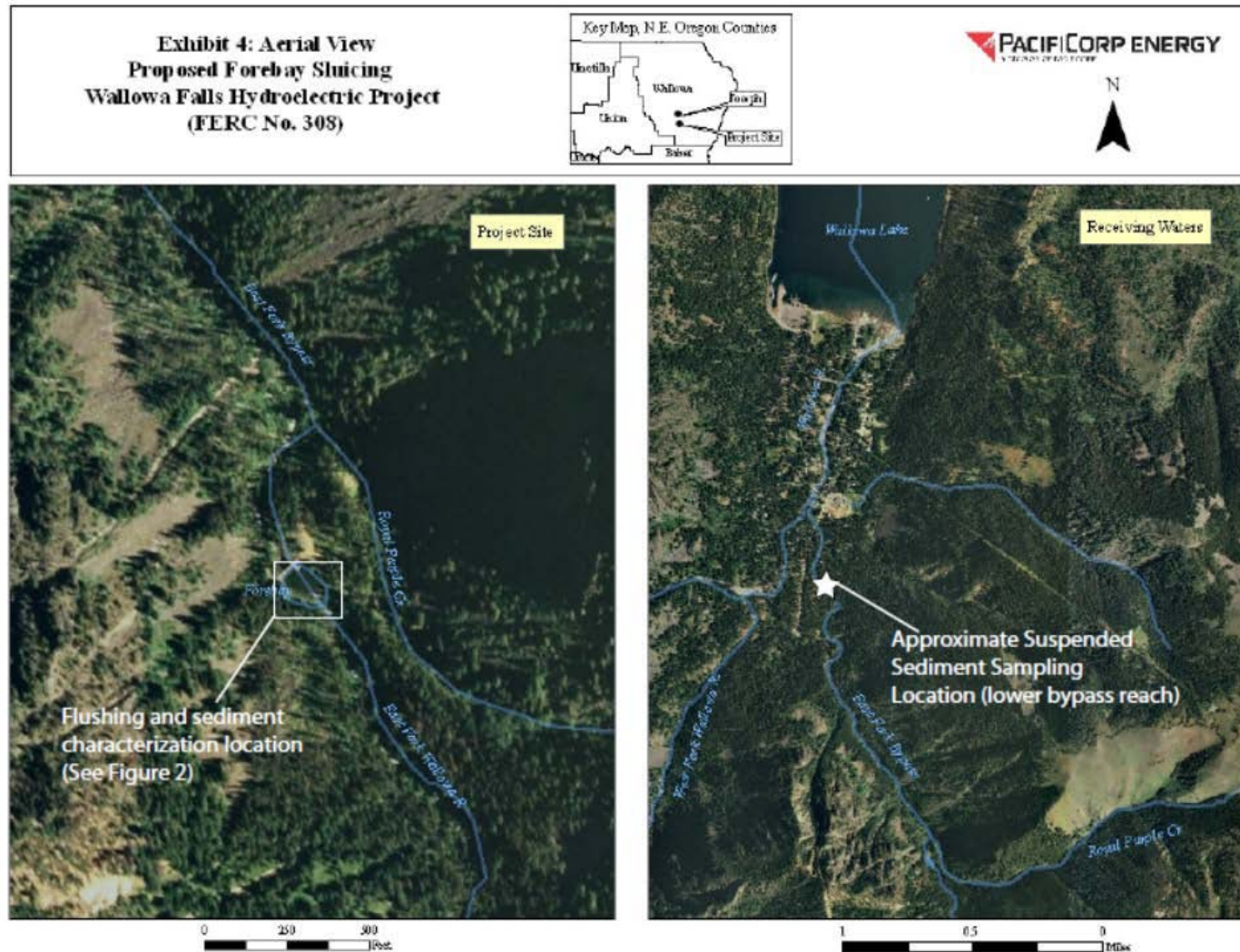


Sediment and Substrate Characterization

Purpose: Data was collected to anticipate and monitor potential changes in water quality and substrate composition in the bypass reach related to the planned activity of flushing sediment from the forebay.

Study Area: The study area includes the East Fork Wallowa River bypass reach from the diversion dam to the confluence with the West Fork Wallowa River and the Project forebay.

Sediment and Substrate Characterization





Sediment and Substrate Characterization

Objectives: Additional data collection in support of permitting and ESA consultation for future forebay flushing

- Determine volume of sediment entrained in forebay
- Characterize sediment in forebay – grain size and metals content
- Characterize surface and subsurface grain size distribution in lower bypass reach
- Obtain baseline sediment and water quality conditions downstream of the dam during June high flow



Sediment and Substrate Characterization

Methods and Field Work Conducted To Date:

- Professional survey of the surface and thickness of the fine grain sediment deposit in the drained forebay was conducted to calculate sediment volume.
- Sediment samples were collected in the forebay and analyzed for metals and particle size distribution at a Test America laboratory.
- Streambed grain size analysis using Wolman surface pebble counts and bulk samples were conducted in the lower bypass reach.
- Suspended sediment surface water samples were collected in the lower bypass reach in June 2012; and analyzed at a Test America laboratory.
- Continuous turbidity monitoring was conducted for the entire month of June 2012 in the lower bypass reach.



Sediment and Substrate Characterization

Characterization of Sediment in the Forebay

- Sediment volumetric survey of the forebay was completed in August 2012
 - Volume of sediment was 560 cubic yards
 - Approximately 316 cubic yards were released in August 2012, 244 cubic yards remain
- Sediment bulk samples were collected from forebay
 - Forebay was divided into 3 units, A, B and C from upstream to downstream
 - Five samples were collected across each unit and composited

Sediment and Substrate Characterization

Metal*	Concentration (mg/kg)		
	Unit A	Unit B	Unit C
Chromium	8.1	12	9.0
Copper	22	38	38
Mercury	0.14	ND	ND
Zinc	38	53	44

* Antimony, Arsenic, Cadmium, Lead, Selenium and Silver were ND in all samples.

Risk Based Screening Levels for Metals in Sediments

- **Oregon Guidance for Ecological Risk Assessment Level II - Freshwater Sediment (ODEQ, 2001)**
 - Chromium: 37 mg/kg*
 - Copper: 36 mg/kg*
 - Zinc: 123 mg/kg*
 - Mercury: 0.2 mg/kg*

* Based on EPA Freshwater Threshold Effects Level (NOAA 1999)

Sediment and Substrate Characterization

Forebay grain size analysis

- Average percentage by size category

Gravel: 10.5%

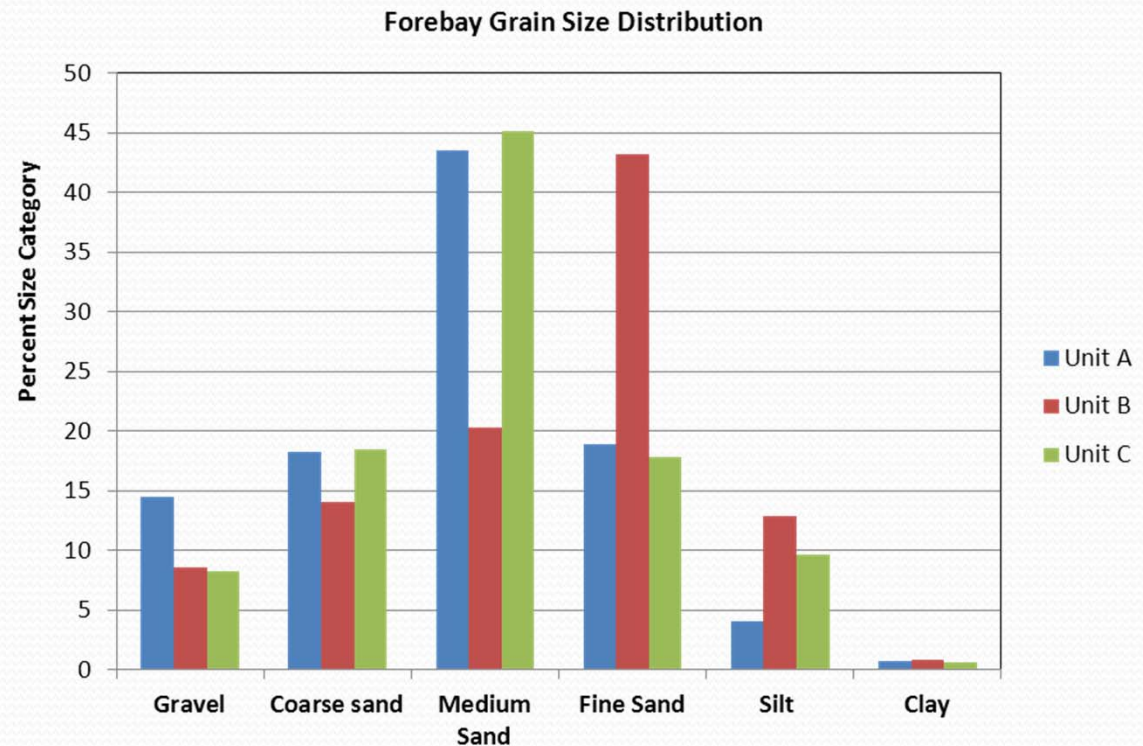
Coarse Sand: 17.0%

Medium Sand: 36.3

Fine Sand: 26.6

Silt: 8.9%

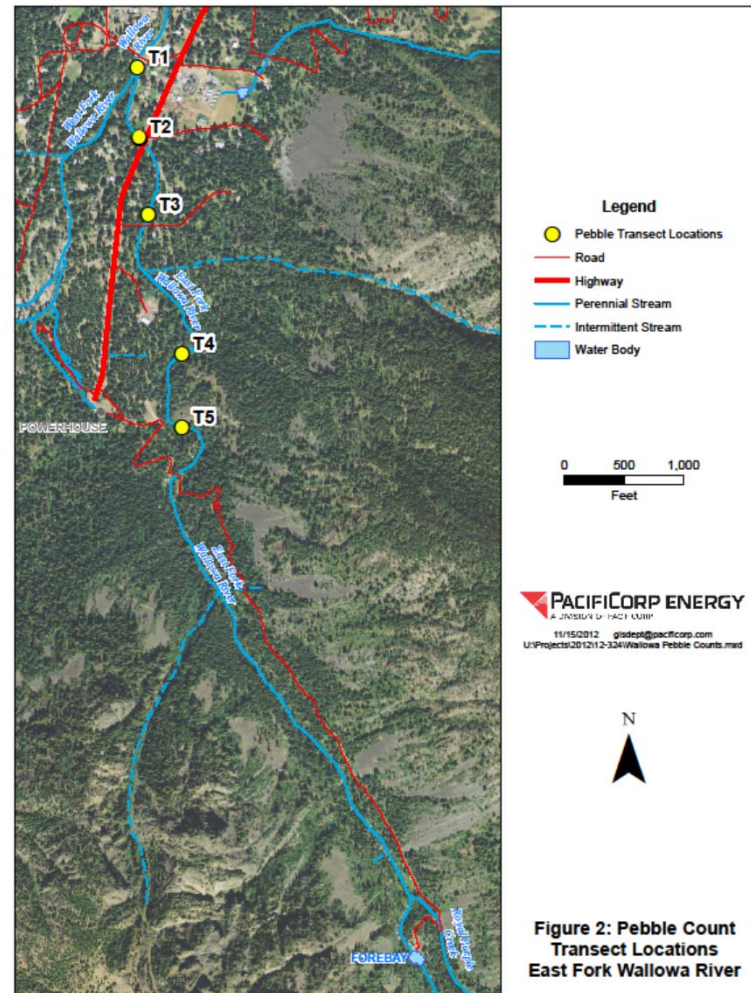
Clay: 0.7%



Sediment and Substrate Characterization

Surface and Subsurface Grain Size Distribution in the Lower Bypass Reach

- Five transects of Wolman pebble counts were completed in October 2012.



Sediment and Substrate Characterization



Transect 5

Sediment and Substrate Characterization



Transect 4

Sediment and Substrate Characterization



Transect 3



Transect 2

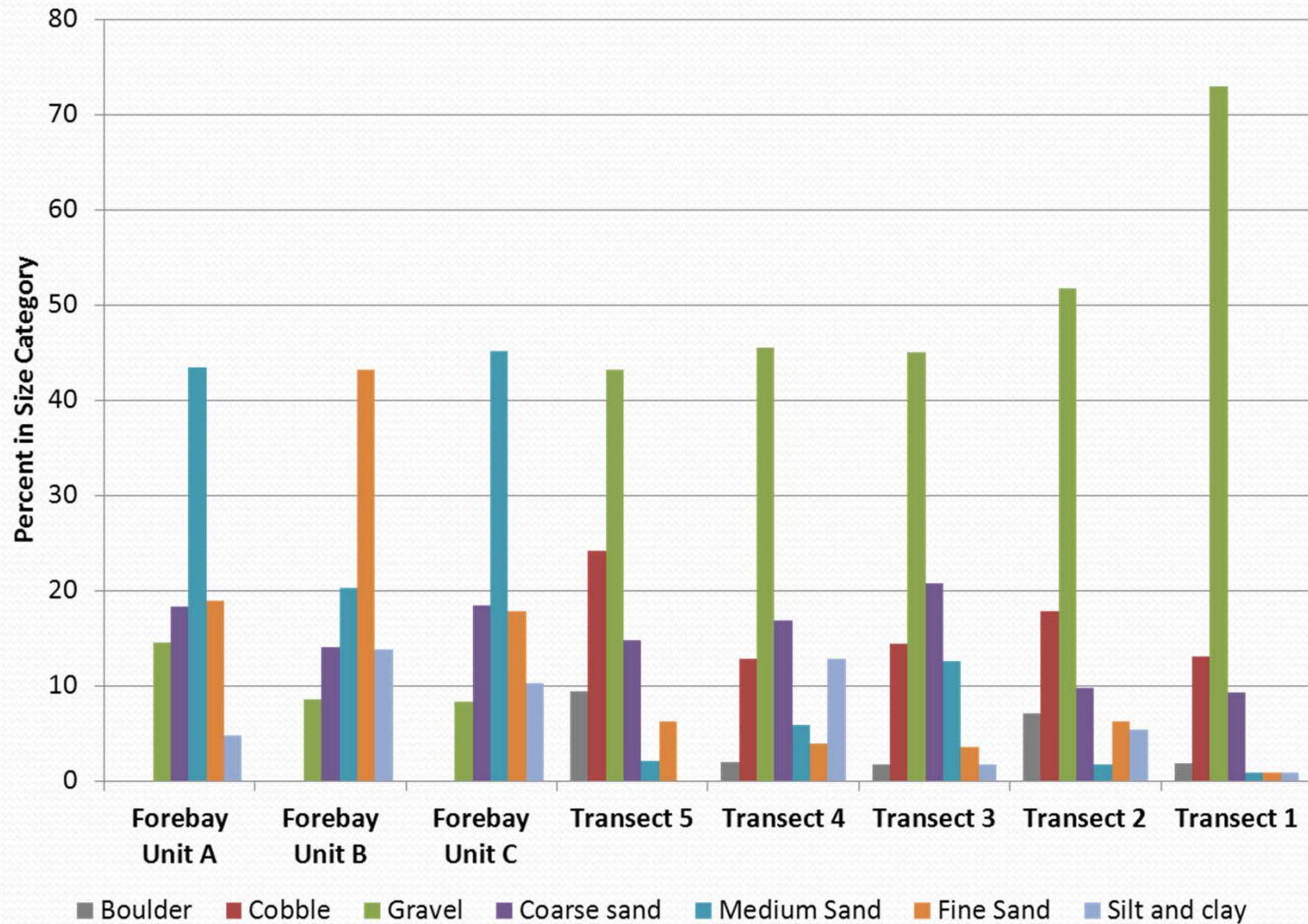
Sediment and Substrate Characterization



Transect 1

Sediment and Substrate Characterization

Forebay and Wallowa River Bypass Reach Grain Size Distributions



Sediment and Substrate Characterization

Total Percentages of Finest Material

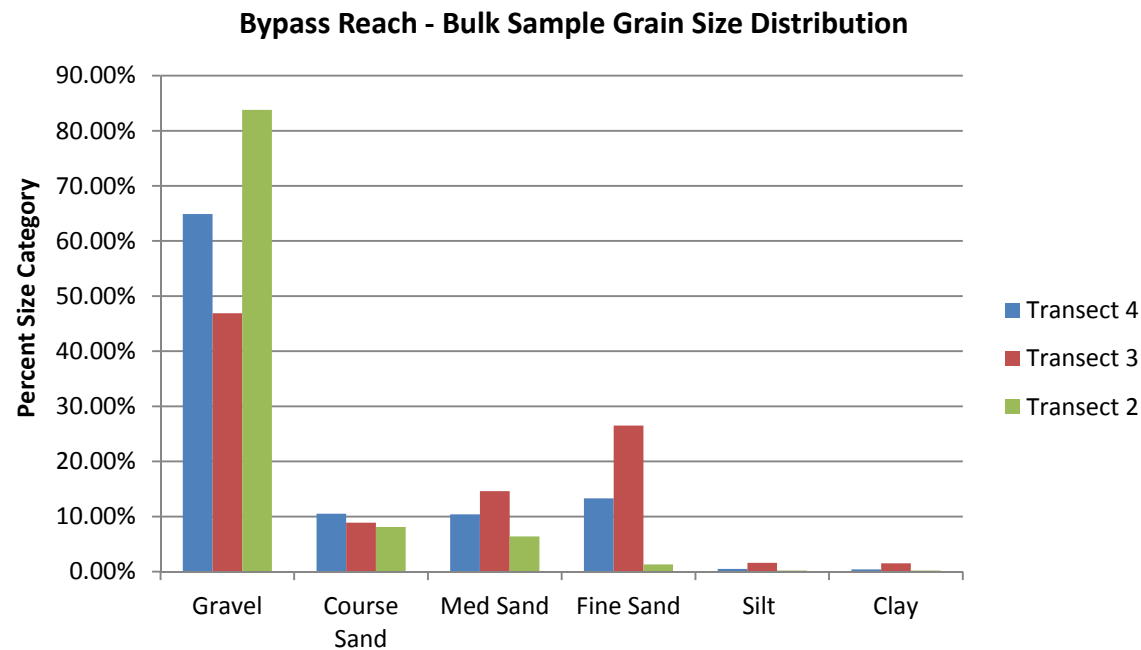
- The small range of grain sizes measured are 0.63 mm – 2mm, these can impact spawning gravels
- Silts and clays can create elevated turbidity
- Note the percentages of fines in forebay samples versus bypass reach transects

	Forebay Units			Lower Bypass Transects				
Percent Finer than	A	B	C	5	4	3	2	1
2 mm	67.2	77.3	73.2	24.2	43.6	51.4	27.7	15.0
0.63 mm	34.2	61.1	35.85	6.3	12.9	1.8	7.1	0.9
Silt and clay	4.8	13.8	10.3	0.0	12.9	1.8	5.4	0.9

Sediment and Substrate Characterization

Bypass Reach Substrate Bulk Samples

- Bulk samples of subarmor layer or river substrates was collected at transect locations 4, 3, and 2.





Sediment and Substrate Characterization

Background Water Quality

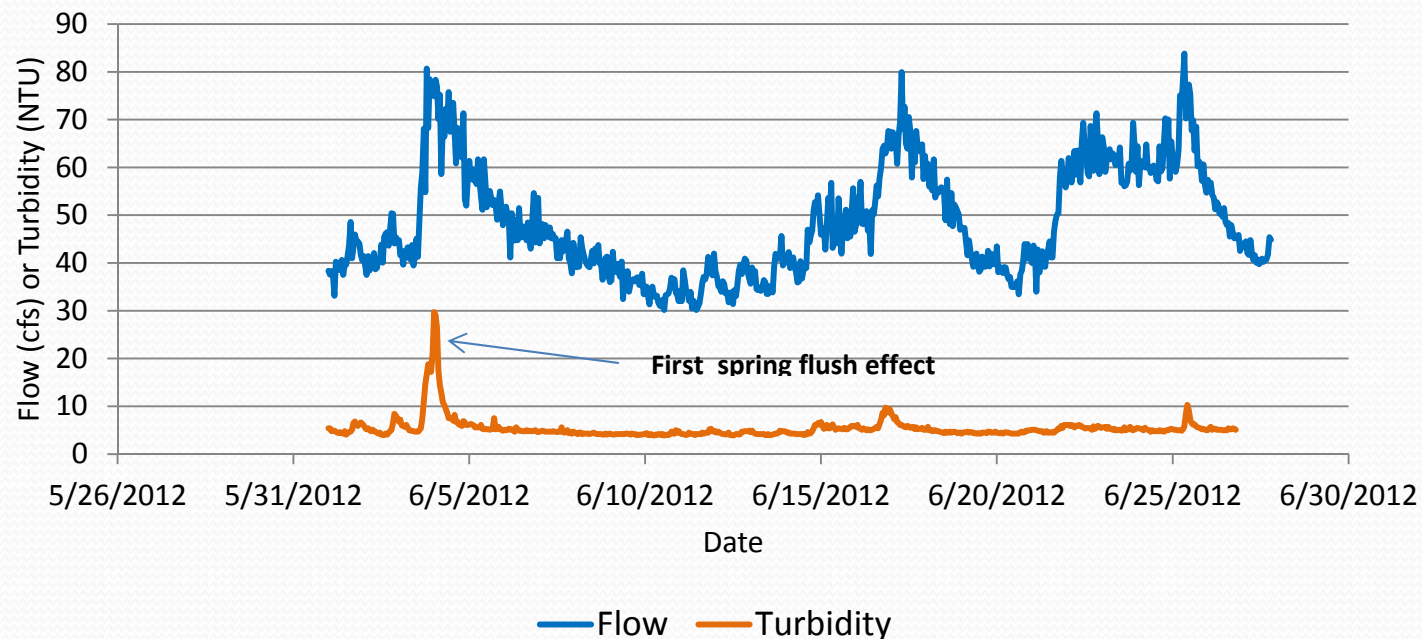
- Background turbidity at the lower staff gage (below the road bridge) in the bypass reach was measured continuously for the month of June 2012.
- Suspended sediment grab samples were collected 100 m upstream of lower staff gage on June 14, 2012. All samples were below laboratory reporting limit of 34 mg/L.

Sediment and Substrate Characterization

Stream Flows

- Highest background turbidity appears to be at the beginning (initial) of the spring freshet.
- Flushing early would provide the **greatest opportunity** for flushed sediment to be re-worked during subsequent flow peaks.

Wallowa River Lower Bypass Reach Gage, Flow and Turbidity June 2012





Sediment and Substrate Characterization

Discussion Points:

- Periodic removal of sediment from the forebay is necessary for continued project operation.
- PacifiCorp will be pursuing all necessary permits and the associated Biological Opinion to flush the forebay in June 2014.
- Forebay flushing will occur annually after 2014 for the term of the current and any future FERC license.
- PacifiCorp is proposing that a Sediment and Substrate Characterization Study Plan be added to the Integrated Licensing Process for the Wallowa Falls Hydroelectric Project.

Additional Work Proposed:

- Repeat Wolman pebble counts and photo documentation of site conditions at the same five transect locations after spring high flows.
- Potentially collect a second set of pebble counts and photos in late summer or early fall.
- Continuous monitoring of background turbidity levels in the East Fork Wallowa River at the upper staff gage upstream of the forebay and the lower staff gage below the road bridge.

Aquatic Resources

Jeremiah Doyle
Aquatic Scientist
PacifiCorp

Species Composition - Fish

Objectives: Composition, relative abundance, temporal and spatial documentation of fish species inhabiting waters within the Project area.

Study Area: Surveys were conducted within the East Fork Wallowa River Bypass Reach, Wallowa Falls Hydro Tailrace, Wallowa Falls Hydro Forebay, and a small portion of the West Fork Wallowa River between the Project tailrace discharge and East Fork/West Fork confluence.

Methods: Electrofishing of streams. Seine and snorkel surveys of forebay.

Field Work Conducted to Date and Study Status: All tasks associated with this Study were completed by the end of September 2012.

Variance to Study Plan: Variances to the FERC Study Plan Determination consisted of the following.

- Due to high flows, the “spring” sampling period was not attempted.
- The electrofishing survey of the bypass reach scheduled for July per the FERC Determination was postponed and conducted in August due to high flows not conducive to the setting of block-nets.



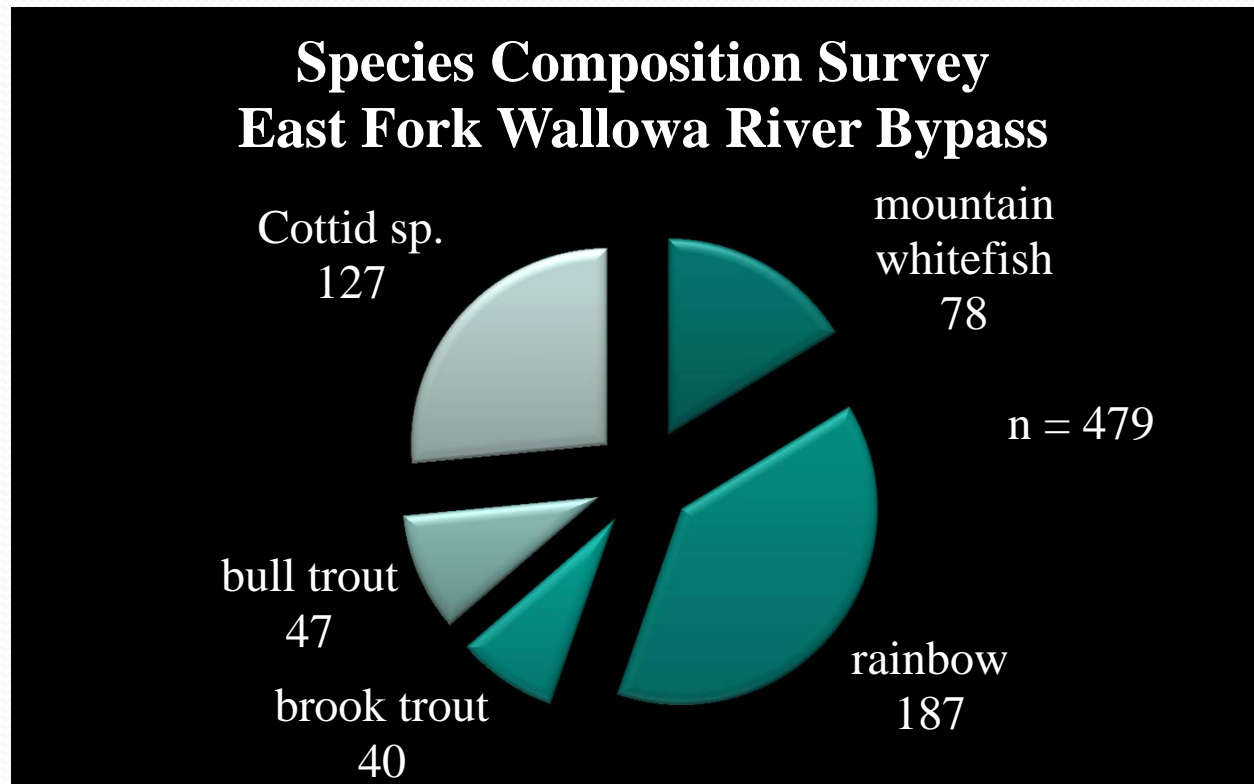
Species Composition –Fish (continued)

- Due to the presence of spawning kokanee, presence/absence electrofishing surveys of the margins of the West Fork Wallowa River between the Project tailrace and the East Fork Wallowa River were halted and not completed.
- The “fall” time-frame seining survey of the Project forebay was not completed after a snorkel survey prior to the seining work identified zero fish presence. Bathymetry of the forebay not conducive to seining.

Discussion Points:

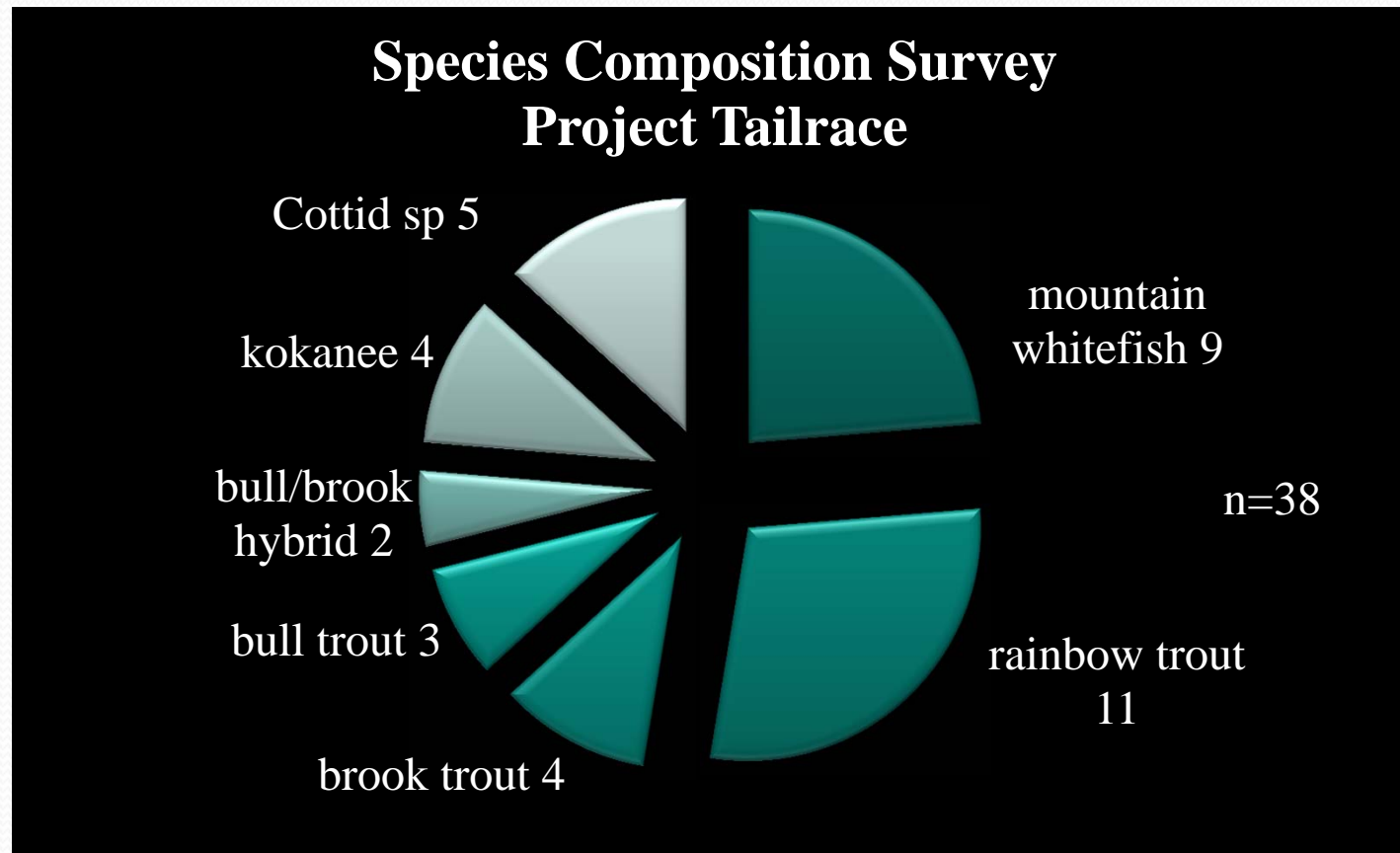
- Field work portion of the Study Plan is substantially complete and the main goals and objectives were accomplished in 2012. High flows hindered the completion of a portion of identified tasks (“spring” efishing surveys) though main objective of a comprehensive survey of the EF Wallowa River below the anadromous barrier in its entirety was accomplished.

Species Composition – Fish (continued)



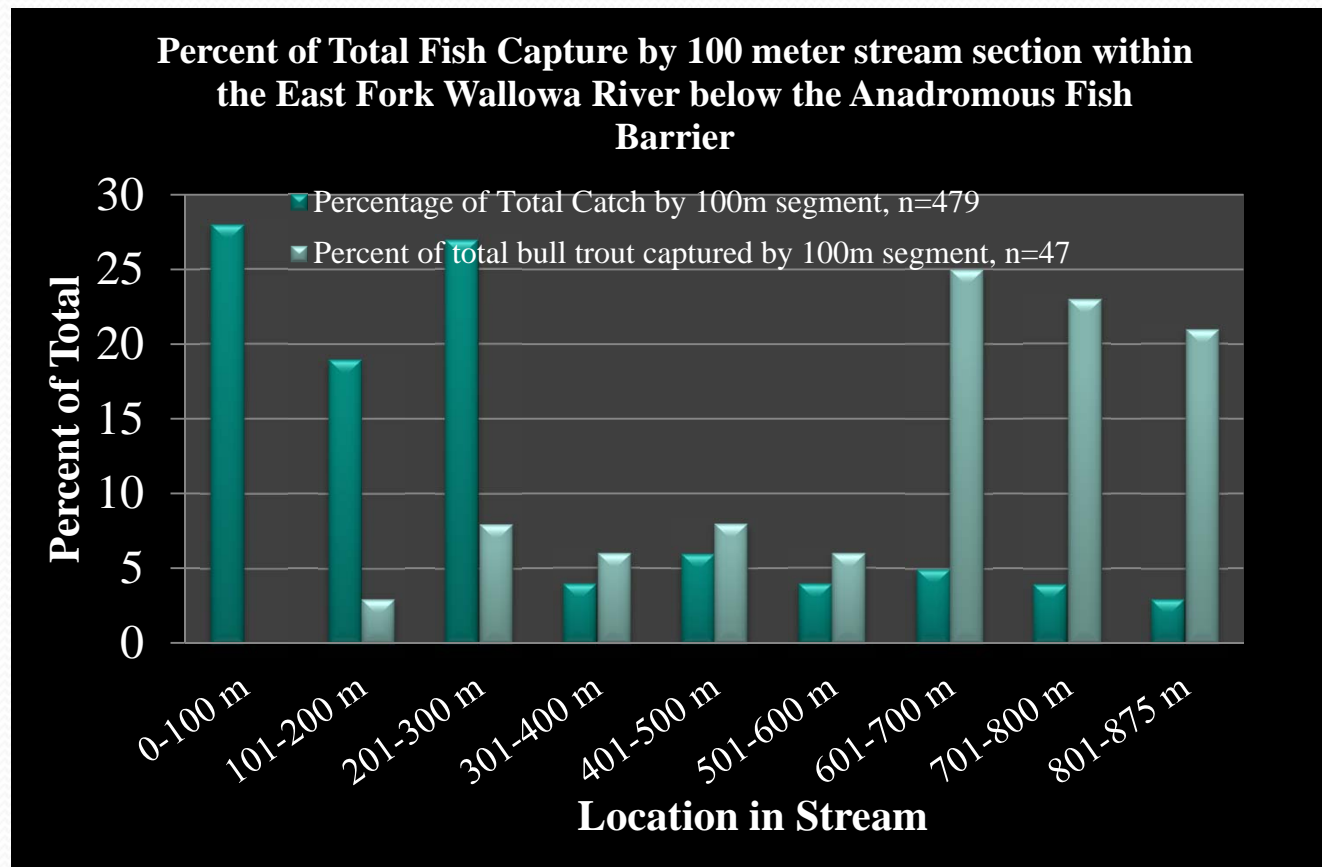
- Average fork length by species captured: *Oncorhynchus mykiss* (rainbow trout) 97 millimeters (mm), *Prosopium williamsonii* (mountain whitefish) 107 mm, *Salvelinus confluentus* (bull trout) 113 mm, *Salvelinus fontinalis* (brook trout) 129 mm, *Cottid sp.* (sculpin) 68 mm.

Species Composition –Fish (continued)



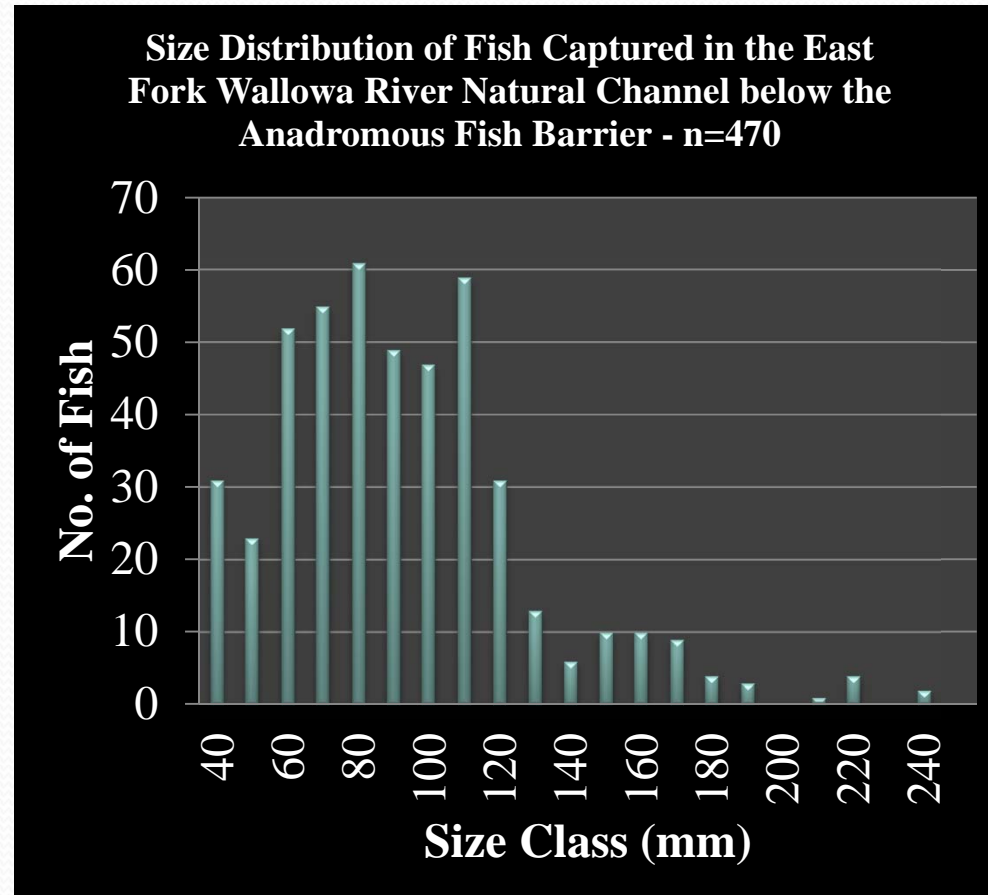
- Average fork length by species captured: rainbow trout 132 mm, mountain whitefish 138 mm, *Oncorhynchus nerka* (kokanee) 205 mm, brook trout 132 mm, bull trout 381 mm, bull/brook trout hybrid 178 mm, *Cottid sp.* (sculpin) 91 mm.

Species Composition – Fish (continued)



- Spatial area within the East Fork Wallowa River (below the anadromous fish barrier) where captured species were encountered.

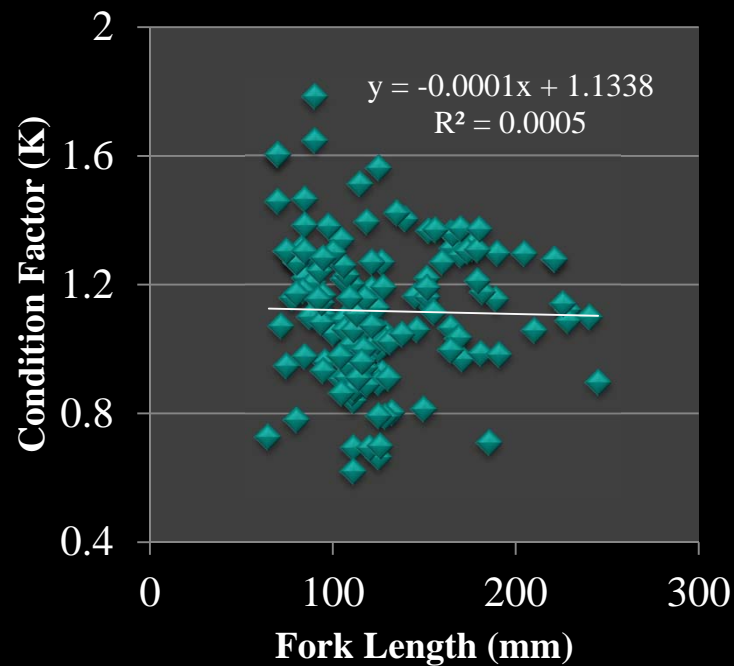
Species Composition – Fish (continued)



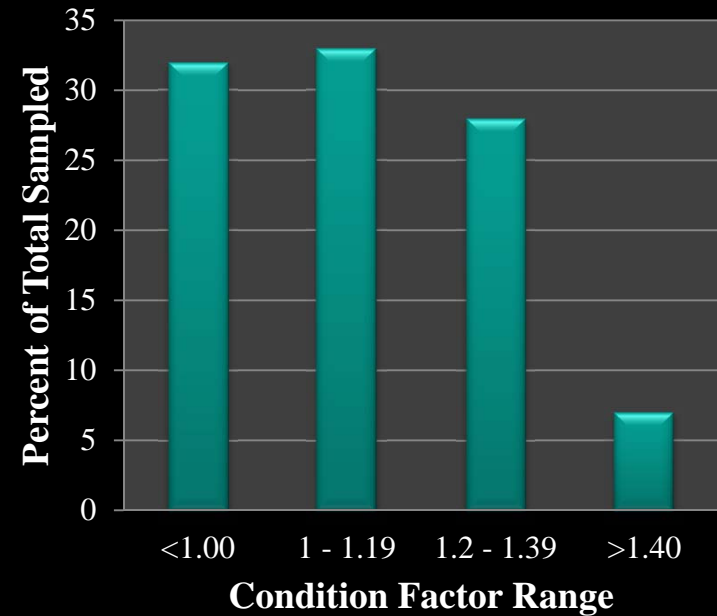
- General size distribution of fish captured below the anadromous fish barrier during East Fork Wallowa species composition electrofishing surveys.

Species Composition – Fish (continued)

**Condition Factors (K) of Fish
Sampled from the East Fork
Wallowa River n=152**



**Percent Distribution of Sampled
Fish Condition Factors from the
East Fork Wallowa River -
n=152**





Species Composition – Fish (continued)

Additional Work Proposed:

- Data analysis and Study Progress Report will be completed June 2013.



Bull Trout use of Project Tailrace and Bypass

Objectives: A better understanding of the current Wallowa River bull trout population upstream of Wallowa Lake, specifically with concern to the Project tailrace and bypassed East fork Wallowa River. It is anticipated this study will shed light on the current distribution of bull trout in waters around the Project; specifically, spatial and temporal distribution within the East Fork Wallowa River natural channel and Project tailrace.

Study Area: Collection efforts to capture and tag bull trout targeted areas within Wallowa Lake, EF Wallowa River bypass reach, and the Project tailrace. Passive Integrated Transponder (PIT) tag antennas located in the Project tailrace and EF Wallowa River bypass reach.

Methods: Identified streams were electrofished to capture bull trout in riverine habitats. Bull trout inhabiting lacustrine areas were captured via passively set tangle nets.

Bull Trout use of Project Tailrace and Bypass – (continued)

Field Work Conducted to Date and Study Status: Bull trout capture events were completed September 2012. Fixed PIT antennas were installed in July 2012 and are currently in streams collecting data.

Variance to Study Plan: No variances to the FERC Study Plan Determination were made during the course of this Study.

Bull Trout use of Project Tailrace and Bypass – (continued)

Discussion Points:

- Field work portion of the Study Plan with concern to capturing and tagging bull trout is complete. Completion of the main goal and objective (bull trout use of Project tailrace and bypass reach) is as yet incomplete as the Study is still on-going.
- 16 bull trout tagged during 2012 activities. 11 from the EF Wallowa River, 4 from the Project tailrace, and 1 from Wallowa Lake.

Bull Trout PIT Tag #	Fork length	Capture Location	Genotype
A0F657C	378	Wallowa Lake	bull trout
591847	215	Tailrace	hybrid
58484B	179	Tailrace	bull trout
A0F65A8	415	Tailrace	bull trout
A89AF23	550	Tailrace	bull trout

Bull Trout PIT Tag #	Fork length	Capture Location	Genotype
6594848	189	100-200m EFW bypass	unknown
C582635	171	200-300m EFW bypass	unknown
C58942B	181	500-600m EFW bypass	unknown
C58803D	179	600-700m EFW bypass	unknown
C58063A	168	600-700m EFW bypass	unknown
C586E5C	191	700-800m EFW bypass	unknown
C58921A	151	700-800m EFW bypass	unknown
C58524D	155	800-900m EFW bypass	unknown
C58924A	245	800-900m EFW bypass	unknown
C589C51	169	800-900m EFW bypass	unknown
C588A60	164	800-900m EFW bypass	unknown

Bull Trout use of Project Tailrace and Bypass – (continued)



Bull Trout use of Project Tailrace and Bypass – (continued)

- Pictured pair (male 550mm fork length, female 415mm fork length) captured in the Project tailrace during an outage on August 13; after tag insertion they were released into the WF Wallowa River at the tailrace confluence.
- The male was subsequently detected moving upstream past the EF Wallowa River PIT antenna on August 29 and detected leaving the system on September 25.
- The female was detected moving upstream past the EF Wallowa River PIT antenna on September 5 and detected leaving the system on September 22.
- Additionally, a bull trout/brook trout hybrid (215mm fork length) captured and tagged during the same August 13 outage was detected moving past the Project tailrace PIT antenna multiple times August - December. This appears to be an over-wintering fluvial fish. From available data collected to date, it seems multiple life-history traits are being exhibited within the upper EF and WF Wallowa River basin.

Bull Trout use of Project Tailrace and Bypass – (continued)

Additional Work Proposed:

- To date, 55 bull trout have been captured by PacifiCorp employees above the Wallowa Lake Irrigation Dam. Of these, 17 have been analyzed by the USFWS Abernathy Genetics Lab with 15 identified as pure bull trout and 2 identified as brook trout/bull trout hybrids. 38 samples collected during EF Wallowa efishing surveys are currently awaiting analysis at the Abernathy Lab.
- If no bull trout tagged during the EF Wallowa River efishing surveys are encountered at the fixed Passive Integrated Transponder (PIT) tag antenna located near the stream mouth in 2012, then additional electrofishing surveys with the goal of recapturing these individuals may be warranted in summer 2013.
- Depending on total data gathered by the end of the initial study period, an additional season of migration data past fixed PIT tag antennas may be warranted in summer/fall 2013.
- Data analysis and Study Progress Report will be completed December 2013.



Macroinvertebrate Surveys

Objectives: Relative Abundance and Composition of Macroinvertebrate Species Residing in Waters in and around the Project.

Study Area: Surveys were conducted within the East Fork Wallowa River Bypass Reach, Wallowa Falls Hydro Tailrace, and above the Wallowa Falls Hydro Forebay.

Methods: Surber Sampler type dip net.

Field Work Conducted to Date and Study Status: All tasks associated with this Study were completed by the end of September 2012.

Variance to Study Plan: There were no variances to the FERC Study Plan Determination during the course of this study.

Discussion Points:

- Field work portion of the Study Plan is complete and the main goals and objectives were accomplished in 2012. Analysis of the samples were conducted by Aquatic Biology Associates in Corvallis, Oregon.



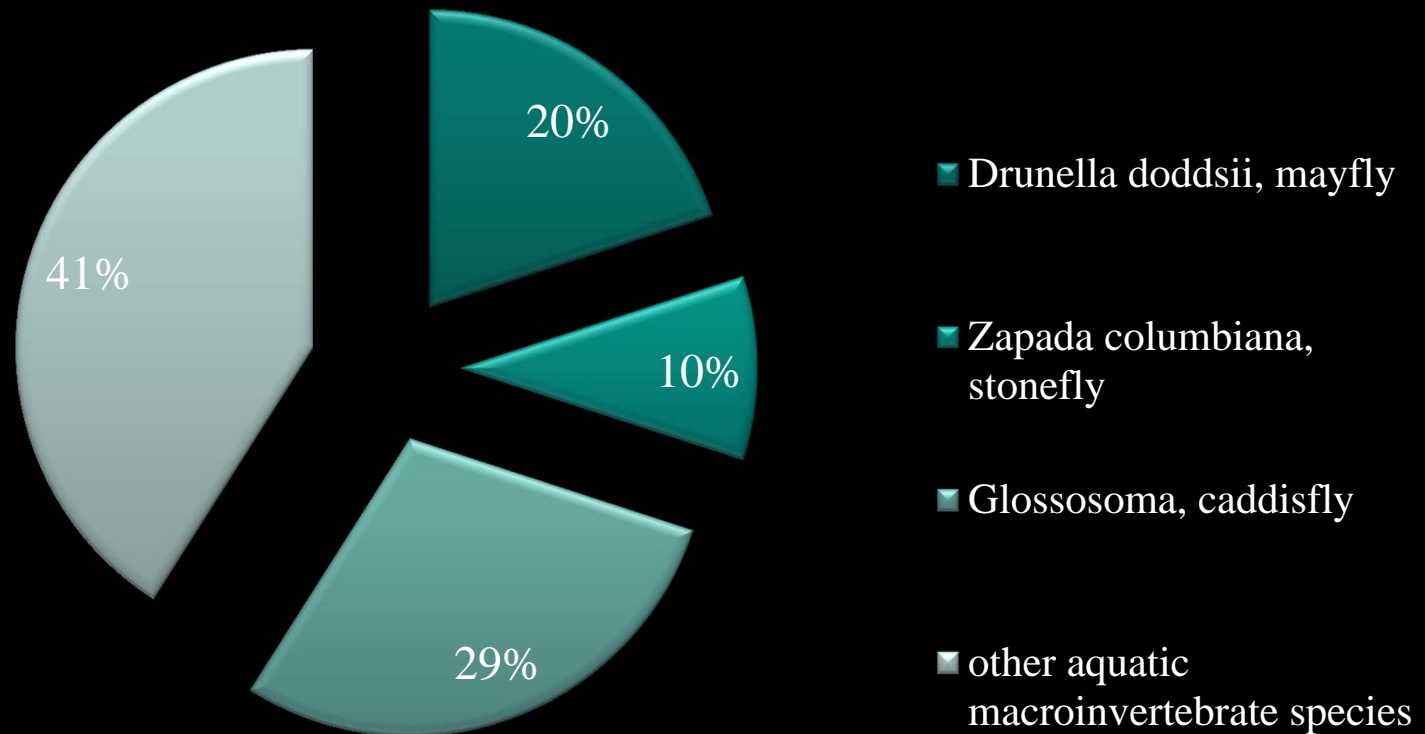
Macroinvertebrate Surveys

Discussion Points:

- Field work portion of the Study Plan is complete and the main goals and objectives were accomplished in 2012. Analysis of the samples were conducted by Aquatic Biology Associates in Corvallis, Oregon.
- Sample locations; the EF Wallowa River just above the Project forebay, the EF Wallowa River 500 meters upstream from the confluence with the WF Wallowa River, and the EF Wallowa River just upstream from the confluence with the WF Wallowa River.
- Samples were gathered on August 23, 2012 and sent to the lab for analysis.
- Taxon richness and diversity increased within the three samples collected the further downstream the sample location. Percent composition of species intolerant to higher water temperatures and lower dissolved oxygen levels also increased in the downstream samples when compared to the samples taken from upstream.
- Though tolerant taxon increased in samples taken from lower in the stream reach, all three samples collected were dominated by moderate to highly intolerant aquatic macroinvertebrate species, indicative of high water quality. 93 percent of the upper sample, 69 percent of the middle sample, and 52 percent of the lower sample consisted of caddisflies, mayflies, or stoneflies known to have stringent habitat requirements in terms of low water temperatures and high dissolved oxygen content (Lillehammer 1988 and Whitney 1939).

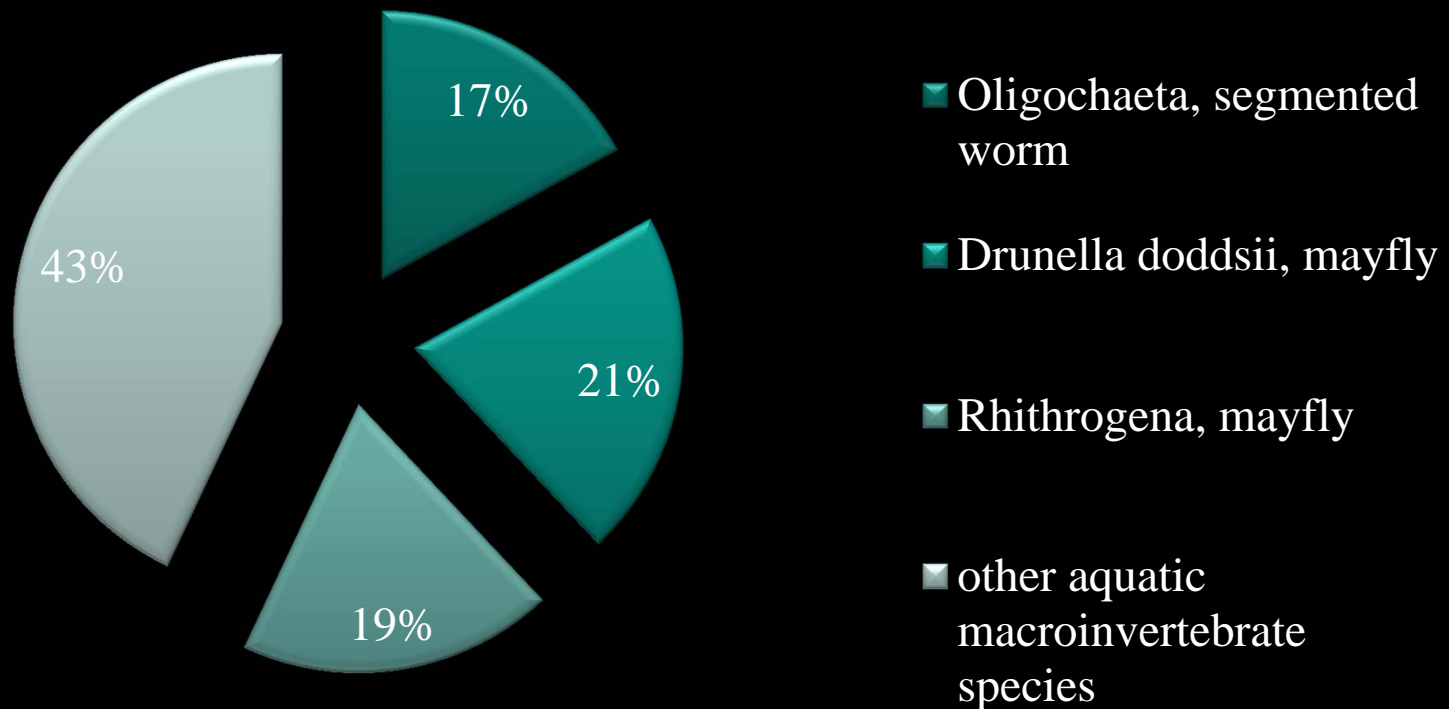
Macroinvertebrate Surveys

**Dominant Aquatic Macroinvertebrate Species Observed
EF Wallowa River Above Forebay Site**



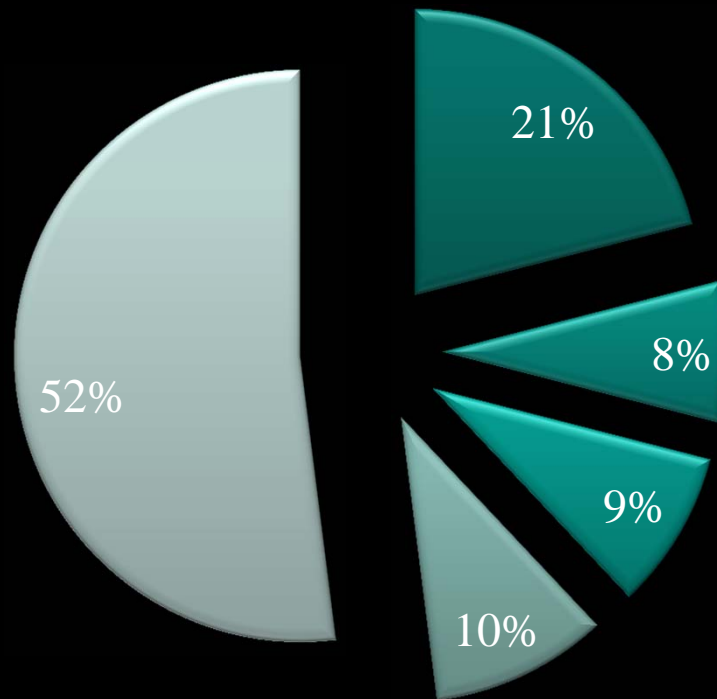
Macroinvertebrate Surveys

Dominant Species Observed EF Wallowa River Middle Site



Macroinvertebrate Surveys

Dominant Species Observed EF Wallowa River Lower Site



■ *Baetis bicaudatus*, mayfly

■ *Drunella doddsii*, mayfly

■ *Eukiefferiella brehmi*
group, midge

■ *Orthocladius* complex,
midge

■ other aquatic
macroinvertebrate species



Macroinvertebrate Surveys

Additional Work Proposed:

- No additional work is proposed at this time.
- Study Progress Report will be completed June 2013.

Instream Flow Study

Kaylea Foster
Aquatic Scientist
PacifiCorp



Instream Flow Study

Objectives: Simulate hydraulic conditions and salmonid habitat over a range of flows in project-affected waters to support a biologically sound decision for establishing minimum flows.

Study Area: East Fork Wallowa bypass reach



Instream Flow Study

IFIM-Based Methods:

- Meso-habitat survey
- Stakeholder meetings
- Hydraulic survey
- PHABSIM modeling



Instream Flow Study

Field Work Conducted to Date and Study Status:

- Habitat survey (May)
- Stakeholder meeting (June)
- Transect level survey (July)
- Hydraulic data collection: (14 transects total)
 - 16 cfs target (July)
 - 8 cfs target (August)
 - 4 cfs target (August)
- PHABSIM modeling and QA\QC (Ongoing)

Instream Flow Study

Variance to Study Plan

- Field work was generally consistent with study plan
- Study target flows compared to gaged flows:

Study Plan Target Q		Gaged Flows
High Flow:	16 cfs	15 cfs
Medium Flow:	8 cfs	7.5 cfs
Low Flow:	4 cfs	5.3 cfs

Instream Flow Study

Discussion

- Velocity-driven system
- Minor stage change = major flow changes
- Implications for modeling



Q	Width	Max Δ	Max % Δ
15.00	17.60	1.00	6.0
7.50	16.80		
5.30	16.60		



Instream Flow Study

Discussion

- Modeling on-track for completion in February-March 2013.
- Measured flows during data collection are sufficient to meet study objectives.
- Results to date are currently available in the Study Progress Report.



Instream Flow Study

Additional Work Proposed:

- No additional field data collection is proposed at this time.
- Modeling and QA\QC of model results is expected to be complete by mid-February 2013.
- A stakeholder meeting to discuss model results is proposed for March 2013.
- Additional meetings to discuss results may be arranged as needed.
- Results/recommendations to be provided in final technical report, June 2013.



Next Steps

- Parking lot items from today
- Additional comments or questions on material discussed?
- Identify unresolved issues and path for follow-up
- Adjourn