Troy Smith
~~July 24~~ August 22, 2013

Provisional – For Discussion Purposes Only

LA and WLA Discussion Materials for ~~July 25~~August 22, 2013 TAC Meeting

Below are my adjusted notes (in no particular order) from the June 27 TAC and July 11 LBWC meetings of items that need to be addressed in developing potential allocation scenarios via the USGS mass balance model to meet the SR-HC May 1 – September 30, 0.07 mg/l TP target at Parma. (Red text represents tentative responses to key points)

Modeling Flowchart – *Draft Flowchart Attached*

Identify how the mass balance vs. AQUATOX modeling efforts are being implemented and tied together in the TMDL development. In a nutshell:

- The USGS Mass Balance Model will help:
  1. Estimate allocations necessary to meet the 0.07 target from May 1 – September 30,
  2. Inform the appropriate allocations, if any, from October 1 – April 30 to meet the 150 mg/m^2 periphyton target as modeled by AQUATOX

- The AQUATOX modeling effort will help:
  1. Estimate TP-periphyton relationship, and a number of other parameters (e.g. sediment) ,
  2. Estimate TP target/allocations needed to meet the 150 mg/m^2 periphyton target from October 1 – April 30 (in conjunction with the USGS Mass Balance Model),
  3. Inform whether the 0.07 target at Parma from May 1 – September 30 will also meet the 150 mg/m^2 periphyton target.

    - Further investigating TP uptake and release by periphyton will benefit the allocation process. However, it initially appears that uptake and release is a rather minor factor during the irrigation season; it may play a larger role during the fall and spring months. This is consistent with Alex Etheridge's (USGS) professional opinion and findings from the August, October, and March synoptic sampling.

Allocation Modeling Scenarios Matrix – *Draft Matrix Attached*

A modeling scenario matrix could help folks determine cost/benefit analyses, and help facilitate the conversation/decisions among the stakeholders about how the allocations should be derived (e.g. lowest price/pound of TP reduction, equal percentage reduction, timeframe to meet target,…?)

- DEQ is soliciting input from the LBWC and other interested stakeholders on potential allocation options that will meet the 0.07 mg/l target at Parma.
  - The Municipal/Industrial Workgroup has committed to provide allocation framework recommendations for the TMDL.

Technology Based Limits for Consideration

Model breakpoints for technology at 1, 0.5, 0.3 (0.35), 0.1, and 0.07 mg/l

- Initial analyses indicate that it may be very difficult to achieve 0.07 mg/l target at Parma with WWTPs discharging above 0.3 mg/l TP.
  - Scenarios in which WWTPs discharge TP above 0.3 mg/l appear capable of neither meeting the 0.07 target via mass balance calculations nor receiving EPA approval.

Unaccounted/Groundwater Flow

Adequately parse out unaccounted vs. groundwater flows.

- To what extent can we practicably separate from groundwater, the small drains, septic, etc. that aren't specifically accounted for in USGS mass balance model?
  1. This potential refinement of the model needs to be balanced with ability to gather and incorporate data in concert with the relative contribution of these sources.
     - Flows and loads from undocumented drains, etc. are likely insignificant with respect to discharge measurement uncertainty in the main-stem and major tributaries. However, some currently-undocumented sources, if found to be significant, may need to be addressed.
       - This is consistent with Alex Etheridge's (USGS) professional opinion and findings from the August synoptic sampling.
  2. Should septic (and other) be given a non-point source load allocation if separated from the unaccounted flows category?
       - The potential calculations for these loads could be identified in an appendix to the TMDL in order to help clarify up-front their potential for use in offsets and trading.

SR-HC Target for the LBR and Critical Low Flows – *Draft Flow Duration Curves Attached*

Clarify the LBR flows needed to meet the SR-HC TMDL target for the LBR of 0.07 mg/l TP.

- The LBR 0.07 target in the SR-HC was based on average Snake River flow years
  1. SR-HC TMDL page 447: "The SR-HC TMDL target for TP for each tributary is a concentration of less than or equal to 0.07 mg/l TP as measured at the mouth of the tributary and applies from May through September. Because the TP target is concentration-based, actual allowable tributary load allocations under the TMDL are dependent on actual tributary flow and will fluctuate from year to year."
     - The SR-HC TMDL states that the target concentration is "less than or equal to 0.07 mg/l" and that load allocations are, "dependent on actual tributary flow."
- EPA advocates that TMDL must also consider critical low flows
     - The EPA is requiring the TMDL address critical low. One possibility is to identify the 90% flow of 401 cfs for the May 1 – September 30 time period (1983 – 2012) as the critical low flow (see revised flow duration curves and data).
       - The current recommendation is to utilize the May 1 – September 30 (1983 – 2012) flow duration curve and identify the 90th percentile flow of 401 cfs as the critical low flow.
- Perhaps design allocations based on tiered approach and flow duration curves for the river (e.g. loads for categories from low flows through high flows)
     - This could be accomplished through a flow duration curve analyses (see revised flow duration curves and data). Potentially identify several categories of flows for the May 1 – September 30 time period (1983 – 2012) to identify corresponding loading allocations.

  - The current recommendation is to utilize the May 1 – September 30 (1983 – 2012) flow duration curve to identify corresponding tiered flows and loads in the TMDL

<u>Adjusting the Mass Balance Model for Alternative Flow Scenarios</u>

The mass balance model for August was developed for flows of approximately 624 cfs at Parma. As we work to develop allocations under differing flow scenarios, how to address associated changes in associated parameters (e.g. concentrations, loading distributions among sources, etc.) that may differ under alternative flow conditions?

- This will be difficult and involve clearly identifying assumptions, but perhaps adjust SW flows across the board by a percentage, recalculate GW contributions, and keep TP the same as measured.

<u>Build-out and Implementation Period</u>

What is the build out period, and how do we estimate future conditions, populations, etc.?

- Rely on the best data, best professional judgment, and input from stakeholders and experts to determine these factors,
- Potential alternatives to an implementation timeline (e.g. identify the end-point targets, point source compliance schedules, review TMDL every five years, and adaptively manage).
  - It is possible to develop the TMDL based on current conditions and a proposed compliance schedule for the point sources (2 compliance periods - 10 years). An implementation time frame for the non-point sources, however, would not be defined. Rather, implementation would be as soon as possible, depending on available funding, cost-sharing, and willing partners to achieve the target.
    - Recommendation is to develop the TMDL based on current conditions and a phased approach of 2 compliance periods for point sources (~10 years). Nonpoint source implementation would be as soon as possible, depending on available funding, cost-sharing, and willing partners to achieve the target.

<u>Defining Reasonable Assurances</u> – *Draft DEQ TMDL Guidance Language Attached*

DEQ, EPA, LBWC, and other stakeholders need to maintain consistent inter-communication as we move through the process to identify specific reasonable assurances, as the broad definition doesn't apply well on site-specific basis.

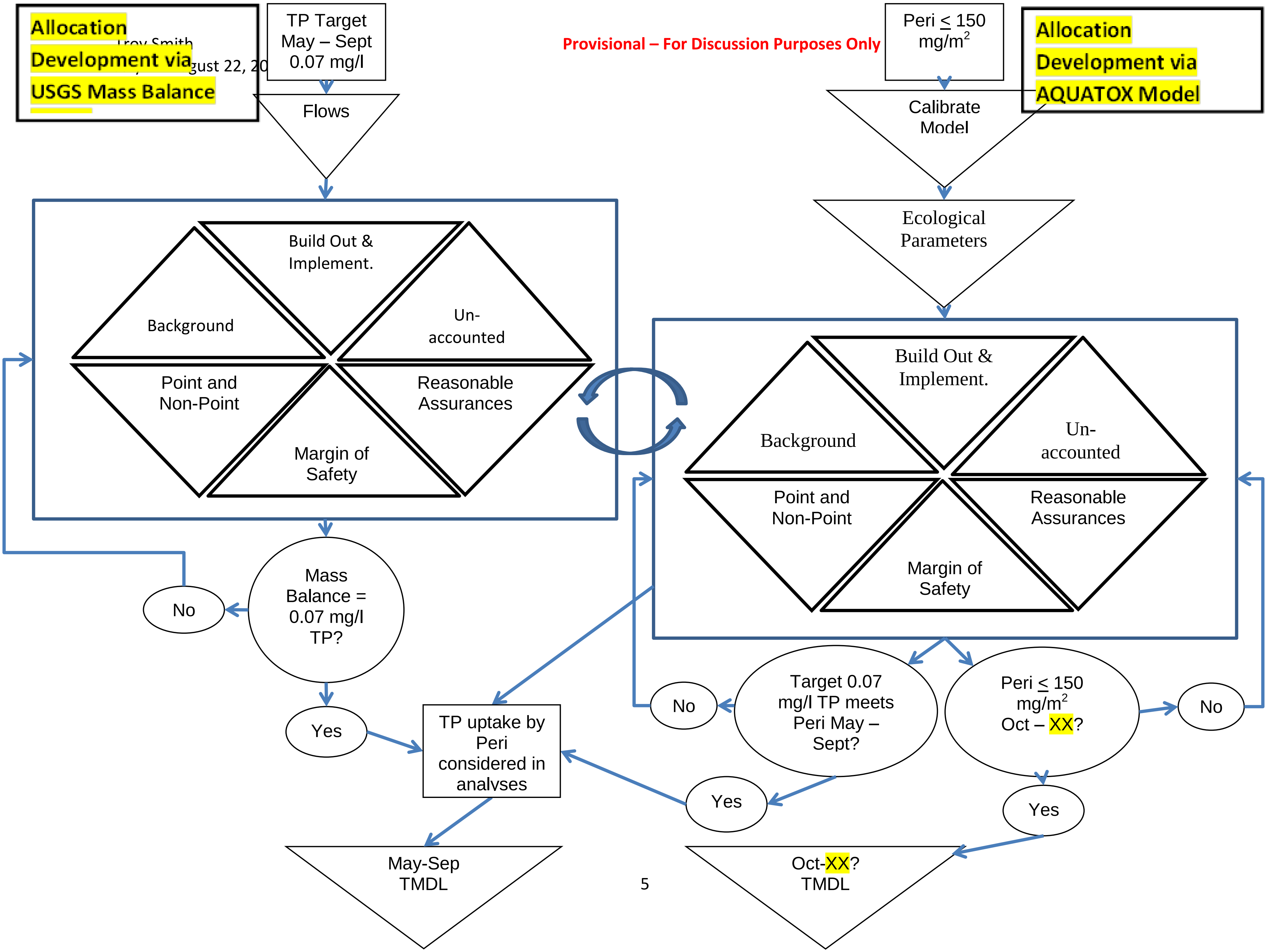
- EPA Guidelines for Reviewing TMDLS (8. Reasonable Assurances): "When a TMDL is developed for waters impaired by both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur…the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards."

<u>Trading</u> – *Draft DEQ TMDL Language Attached*

DEQ, EPA, LBWC, and other stakeholders should to clearly understand the potential gains and limitations of trading and their relationship to the TMDL. This will be critical for planning how allocations may be addressed through possible trading.

- DEQ will support trading in the LBR subbasin to the extent practicable,

- EPA does not support trading in the LBR subbasin until a TMDL is complete,
- The potential for trading will be identified in the TMDL, but the trading specifics and framework will be developed outside of the TMDL process.
    - Discussion within the LBWC and TAC of including some additional trading language as an appendix to the TMDL.
    - DEQ state office will try to directly address many of the trading questions at the August 22 Open House, and at the September 12 LBWC Meeting.


Allocation Development via USGS Mass Balance
TP Target May – Sept 0.07 mg/l
Flows
Build Out & Implement.
Background
Un-accounted
Point and Non-Point
Reasonable Assurances
Margin of Safety
Mass Balance = 0.07 mg/l TP?
No
Yes
TP uptake by Peri considered in analyses
May-Sep TMDL
Peri ≤ 150 mg/m2
Allocation Development via AQUATOX Model
Calibrate Model
Ecological Parameters
Build Out & Implement.
Background
Un-accounted
Point and Non-Point
Reasonable Assurances
Margin of Safety
Target 0.07 mg/l TP meets Peri May – Sept?
Peri ≤ 150 mg/m2 Oct – XX?
No
No
Yes
Yes
Oct-XX? TMDL

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Draft Mass Balance Model and Allocation Matrix July 24, 2013

Scenario	Flows (cfs)	Background Concentration (mg/l)	+	Point Source Discharge or Mass Equivalent (mg/l)	+	Non-Point Contribution (mg/l)	+	Groundwater & Unmeasured (mg/l)	+	Stormwater & Other (mg/l)	=	TP Target (mg/l)
Current 1	624	~0.02	+	>0.3	+	0.07	+	0.07	+	0.07	=	>0.07
Current 2				0.3		>0.07		>0.07		>0.07		>0.07
Current 3				0.3		0.07		0.07		0.07		0.07
Current 4				0.07		0.07		0.07		0.07		0.07
1a – e	Low - High	~0.02	+	1.0	+	0.07	+	0.07	+	0.07	=	>0.07
2a – e	Low - High	~0.02	+	0.5	+	0.07	+	0.07	+	0.07	=	>0.07
3a	Low	~0.02	+	0.3	+	?	+	?	+	?	=	0.07 ??
3b	Dry											
3c	Midrange											
3d	Moist											
3e	High											
4a	Low	~0.02	+	0.1	+	?	+	?	+	?	=	0.07 ??
4b	Dry											
4c	Midrange											
4d	Moist											
4e	High											
5a	Low	~0.02	+	0.07	+	?	+	?	+	?	=	0.07 ??
5b	Dry											
5c	Midrange											
5d	Moist											
5e	High											

Difficult to Meet 0.07 via Mass Balance or Receive EPA Approval

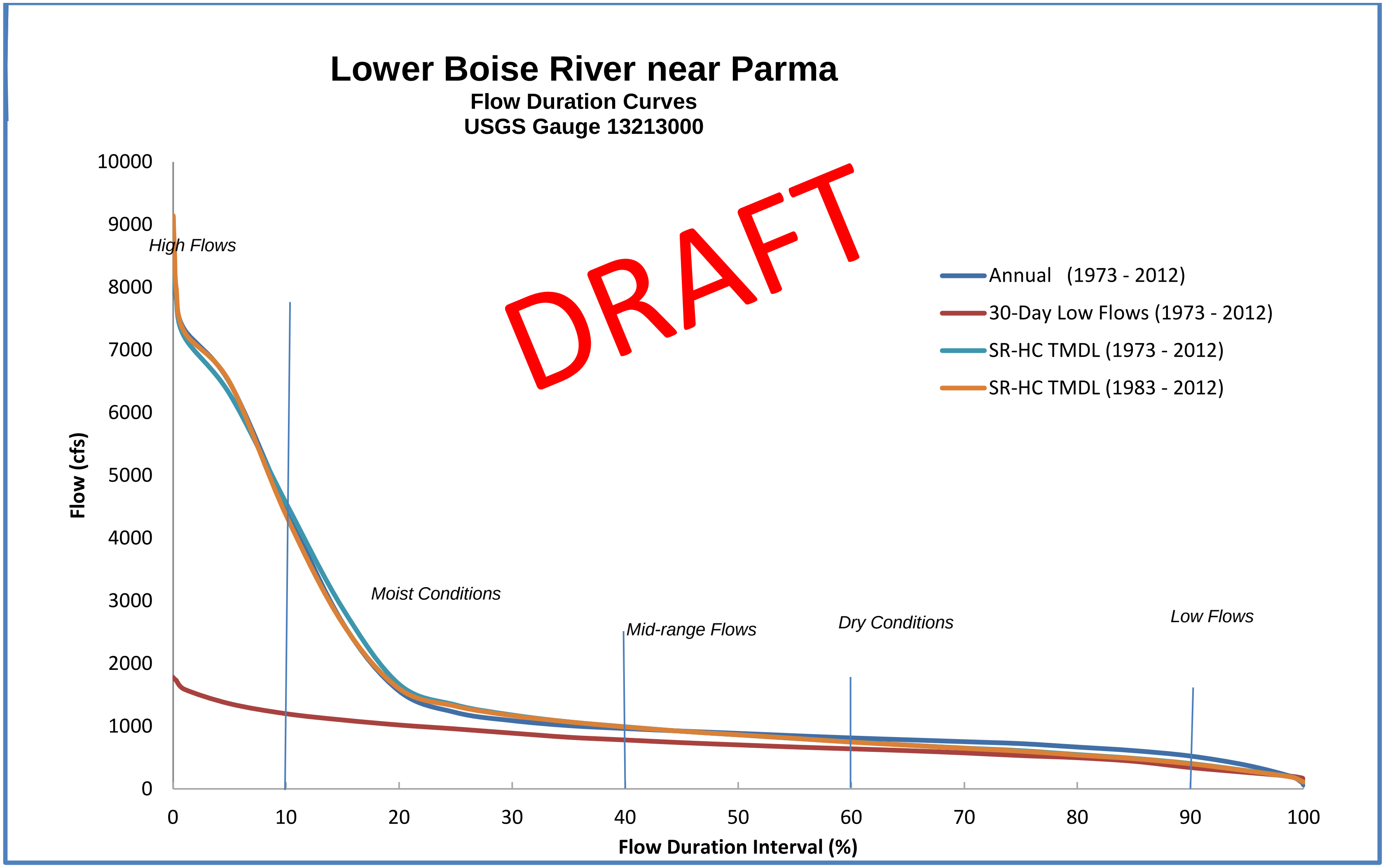
May 1 – September 30 (1983 – 2012) Data for Critical Low and Tiered Flows

Flow Duration Curves for the Lower Boise River at Parma

Lower Boise River at Parma Gage
Flow Duration Data

Percentile	Interval	Annual (1973 - 2012)	30-Day Low Flows (1973 - 2012)	SR-HC TMDL (1973 - 2012)	SR-HC TMDL (1983 - 2012)
			July 20 - Aug 17	May 1 - Sept 30	May 1 - Sept 30
0.0%	0.0	9140	1780	9140	9140
0.1%	0.1	7967	1750	8264	8547
0.3%	0.3	7828	1734	7857	7995
1.0%	1.0	7330	1590	7210	7290
5.0%	5.0	6480	1360	6300	6488
10.0%	10.0	4485	1200	4560	4366
15.0%	15.0	2650	1100	2880	2640
20.0%	20.0	1560	1020	1670	1600
25.0%	25.0	1220	958	1340	1320
30.0%	30.0	1090	890	1180	1170
35.0%	35.0	1010	824	1070	1070
40.0%	40.0	964	781	992	989
45.0%	45.0	923	739	920	920
50.0%	50.0	887	703	863	864
55.0%	55.0	849	669	806	807
60.0%	60.0	814	640	752	747
65.0%	65.0	784	611	700	698
70.0%	70.0	754	575	652	648
75.0%	75.0	723	533	611	602
80.0%	80.0	668	498	549	541
85.0%	85.0	611	441	488	483
90.0%	90.0	525	341	406	401
95.0%	95.0	377	263	292	289
99.0%	99.0	194	201	191	187
99.9%	99.9	102	176	122	122
100.0%	100.0	66	158	108	108

Flow Duration Curves for the Lower Boise River at Parma



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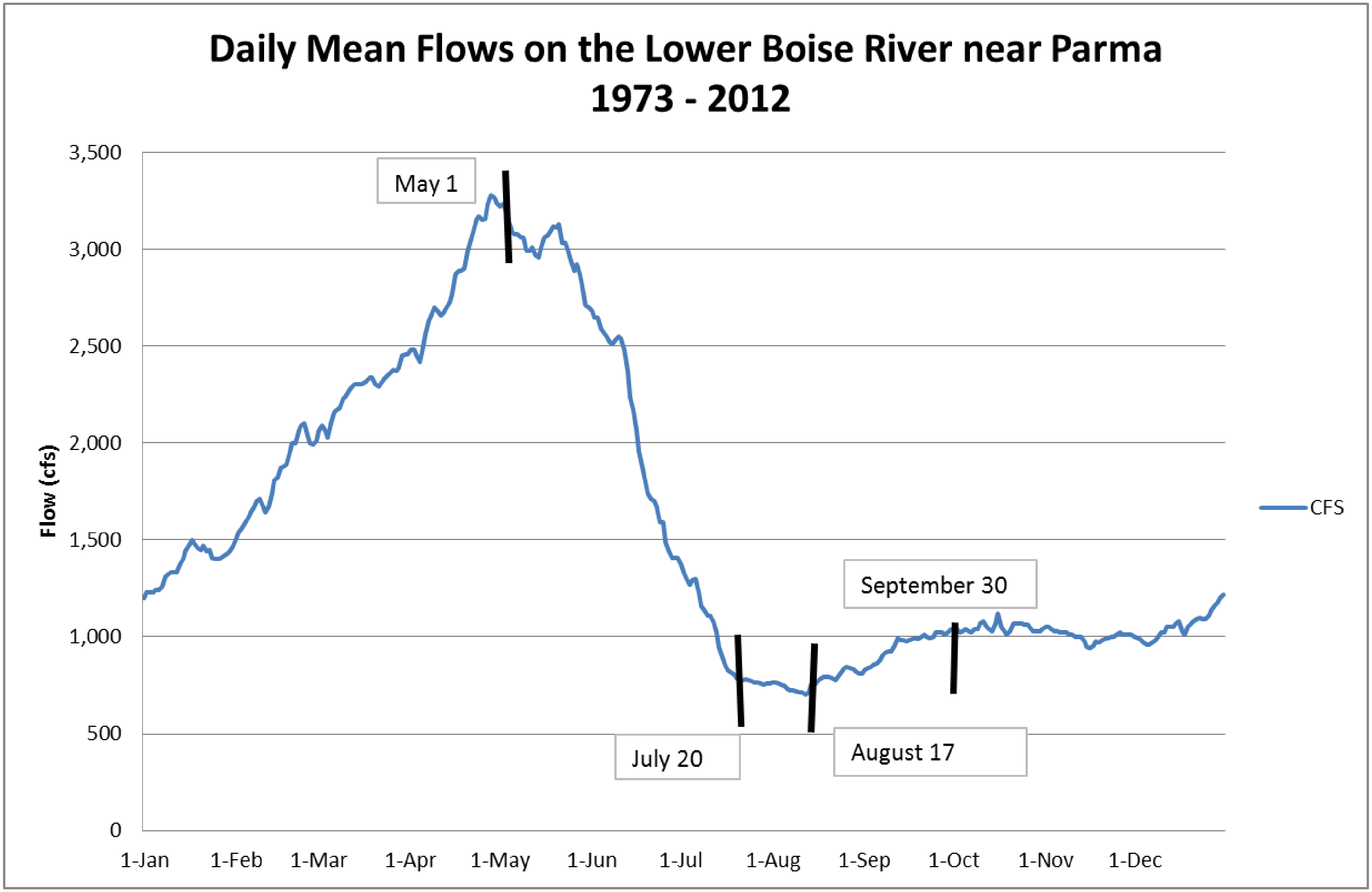

Time-series: Daily s GO s 0-05- GO -series: Daily GO

00060, Discharge, cubic feet econd,

f daily mean values for each day for 36 - 37 years of record in, cfs (Calculation Period 1970-10-01 -> 2012-

Day of month	CFS	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1,200	1,510	2,060	2,480	3,220	2,680	1,370	767	826	1,040	1,050	1,000
2	1,230	1,540	2,090	2,480	3,230	2,650	1,340	767	836	1,040	1,050	994
3	1,230	1,560	2,060	2,450	3,210	2,650	1,300	756	843	1,020	1,040	990
4	1,230	1,590	2,030	2,420	3,140	2,590	1,270	754	855	1,030	1,030	973
5	1,240	1,610	2,100	2,500	3,090	2,570	1,290	749	862	1,040	1,030	957
6	1,240	1,640	2,160	2,560	3,080	2,550	1,300	731	880	1,030	1,020	960
7	1,260	1,670	2,170	2,630	3,080	2,520	1,230	726	904	1,020	1,020	972
8	1,310	1,700	2,180	2,670	3,060	2,510	1,160	726	919	1,040	1,020	983
9	1,320	1,710	2,230	2,700	3,060	2,530	1,140	718	926	1,040	1,010	1,000
10	1,330	1,670	2,240	2,680	2,990	2,550	1,110	711	925	1,070	1,010	1,020
11	1,330	1,640	2,270	2,660	2,990	2,540	1,110	710	955	1,080	1,000	1,020
12	1,330	1,670	2,290	2,670	3,010	2,480	1,080	700	996	1,050	998	1,050
13	1,370	1,740	2,300	2,700	2,970	2,370	1,020	714	984	1,040	1,000	1,050
14	1,400	1,810	2,300	2,730	2,960	2,240	947	751	985	1,030	977	1,050
15	1,440	1,820	2,300	2,770	3,010	2,170	896	754	975	1,070	950	1,070
16	1,470	1,870	2,310	2,870	3,060	2,070	852	772	981	1,120	945	1,080
17	1,500	1,880	2,320	2,890	3,070	1,960	830	783	986	1,050	953	1,030
18	1,480	1,890	2,340	2,890	3,090	1,880	817	792	993	1,030	977	1,010
19	1,460	1,950	2,340	2,900	3,120	1,800	804	792	990	1,010	973	1,050
20	1,450	2,000	2,300	2,990	3,110	1,740	790	795	998	1,030	982	1,070
21	1,470	2,000	2,290	3,030	3,130	1,710	780	789	1,010	1,070	987	1,080
22	1,440	2,060	2,310	3,090	3,030	1,700	778	778	1,000	1,070	992	1,090
23	1,450	2,090	2,330	3,150	3,030	1,670	783	795	995	1,070	1,000	1,100
24	1,410	2,100	2,350	3,170	3,000	1,590	774	814	1,000	1,070	1,000	1,090
25	1,400	2,040	2,360	3,150	2,940	1,590	771	839	1,020	1,060	1,010	1,090
26	1,400	2,000	2,380	3,160	2,890	1,490	766	846	1,020	1,060	1,020	1,110
27	1,410	1,990	2,370	3,230	2,920	1,440	763	841	1,020	1,040	1,010	1,140
28	1,420	2,010	2,390	3,280	2,870	1,410	756	835	1,010	1,030	1,010	1,160
29	1,430	2,540	2,450	3,270	2,780	1,410	751	819	1,020	1,030	1,010	1,180
30	1,440		2,460	3,240	2,710	1,410	756	813	1,040	1,030	1,010	1,200
31	1,470		2,460		2,700		758	813		1,040		1,220

Reasonable Assurance Language Taken from the 2013 DEQ TMDL Addendum Template (to be used for the LBR TP TMDL)

Reasonable Assurance

Identify the agencies and entities who are DMAs (Designated Management Agencies) who will help with implementation, opportunities DEQ and the WAG are committed to following up on, financial resources from 319 or USDA programs, and any other financial commitments in the watershed. Provide enough detail about how nonpoint sources and point sources will achieve the reductions called for.

If the WLA relies on the LA to meet the target, you need to describe how or why the nonpoint sources will comply with their load reductions.

Pollutant Trading Language Taken from the 2013 DEQ TMDL Addendum Template (to be used for the LBR TP TMDL)

Pollutant Trading

Pollutant trading (also known as water quality trading) is a contractual agreement to exchange pollution reductions between two parties. Pollutant trading is a business-like way of helping to solve water quality problems by focusing on cost-effective, local solutions to problems caused by pollutant discharges to surface waters. Pollutant trading is one of the tools available to meet reductions called for in a TMDL where point and nonpoint sources both exist in a watershed.

The appeal of trading emerges when pollutant sources face substantially different pollutant reduction costs. Typically, a party facing relatively high pollutant reduction costs compensates another party to achieve an equivalent, though less costly, pollutant reduction.

Pollutant trading is voluntary. Parties trade only if both are better off because of the trade, and trading allows parties to decide how to best reduce pollutant loadings within the limits of certain requirements.

Pollutant trading is recognized in Idaho's water quality standards at IDAPA 58.01.02.055.06. DEQ allows for pollutant trading as a means to meet TMDLs, thus restoring water quality limited water bodies to compliance with water quality standards. DEQ's *Water Quality Pollutant Trading Guidance* sets forth the procedures to be followed for pollutant trading (DEQ 2010).

Trading Components

The major components of pollutant trading are trading parties (buyers and sellers) and credits (the commodity being bought and sold). Ratios are used to ensure environmental equivalency of trades on water bodies covered by a TMDL. All trading activity must be recorded in the trading database by DEQ or its designated party.

Both point and nonpoint sources may create marketable credits, which are a reduction of a pollutant beyond a level set by a TMDL:

- Point sources create credits by reducing pollutant discharges below NPDES effluent limits set initially by the wasteload allocation.
- Nonpoint sources create credits by implementing approved BMPs that reduce the amount of pollutant runoff. Nonpoint sources must follow specific design, maintenance, and monitoring requirements for that BMP; apply discounts to credits generated, if required; and provide a water quality contribution to ensure a net environmental benefit. The water quality contribution also ensures the reduction (the marketable credit) is surplus to the reductions the TMDL assumes the nonpoint source is achieving to meet the water quality goals of the TMDL.

Watershed-Specific Environmental Protection

Trades must be implemented so that the overall water quality of the water bodies covered by the TMDL are protected. To do this, hydrologically based ratios are developed to ensure trades between sources distributed throughout TMDL water bodies result in environmentally equivalent or better outcomes at the point of environmental concern. Moreover, localized adverse impacts to water quality are not allowed.

Trading Framework

For pollutant trading to be authorized, it must be specifically mentioned within a TMDL document. After adoption of an EPA-approved TMDL, DEQ, in concert with the WAG, must develop a pollutant trading framework document. The framework would mesh with the implementation plan for the watershed that is the subject of the TMDL. The elements of a trading document are described in DEQ's pollutant trading guidance (DEQ 2010).