Preliminary

Fivemile and Tenmile Creek 2012 Water Quality Sampling Results

…and a few "general observations"

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Acknowledgement

ACHD data, information and mapping by ACHD storm water quality staff and contractors.

ACHD water quality staff include:

- Erica Anderson Maguire,
- Monica Lowe,
- Adam Van Patten, and
- Jason Korn.

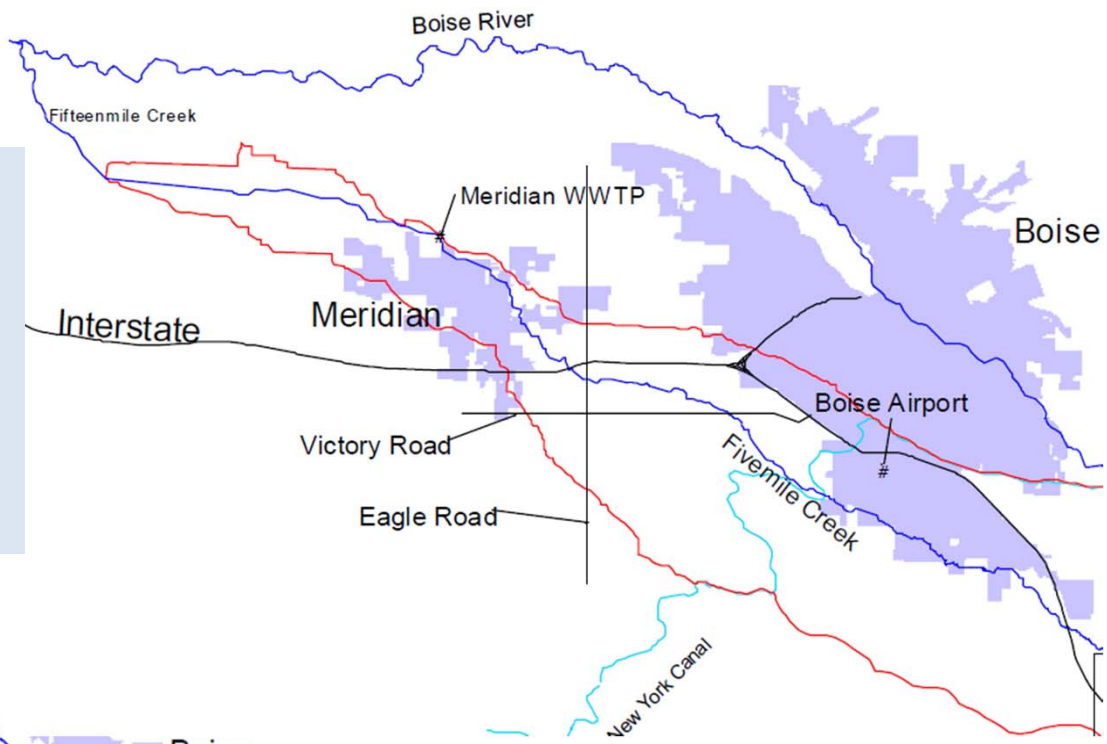
Ref: 2012 Status Report for Pollutants of Concern in Fivemile and Tenmile Creeks (Harrison 2013)

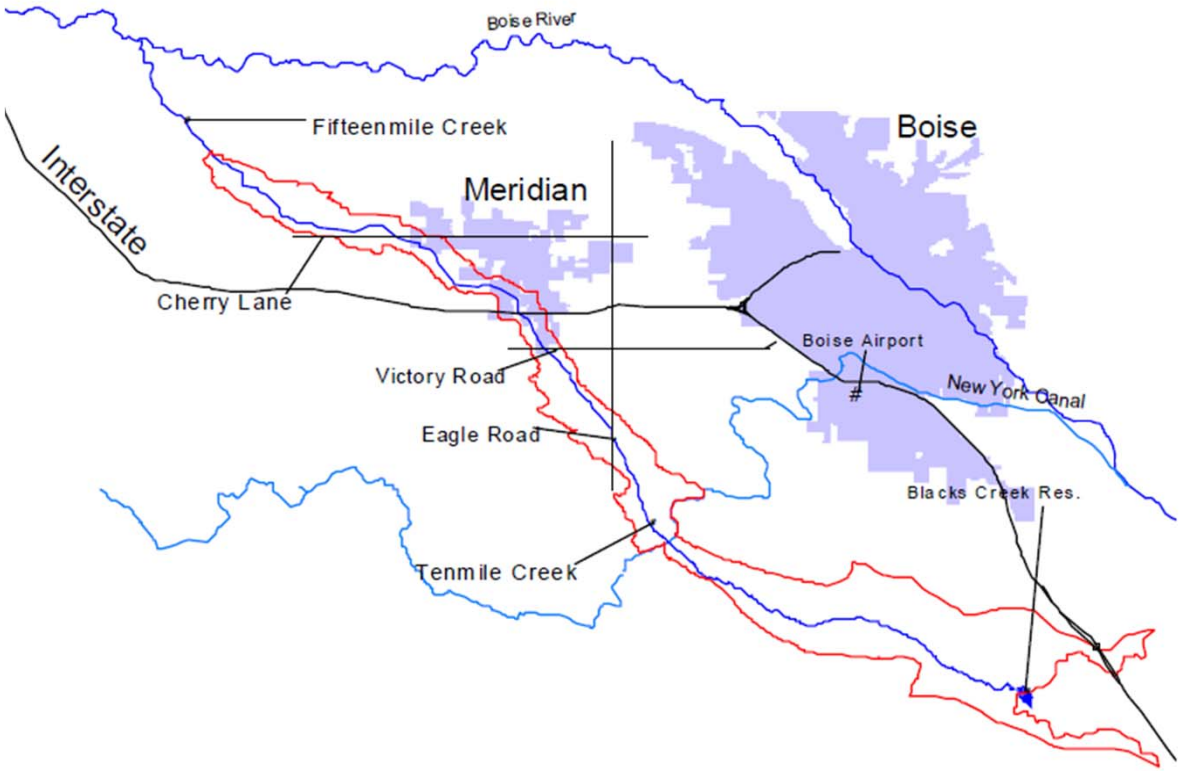
…can be found online at http://www.achdidaho.org/Departments/TechServices/Docs/Drainage/20112012/ACHD%202012%205%2010mile%20WQ%20Status%20Report.pdf

Sampling focused on TSS, TP and bacteria (i.e., *E. coli*)

…the three Pollutants of Concern identified in ACHD's NPDES MS4 Phase II Permit (EPA 2009).

5 and 10-mile Watersheds

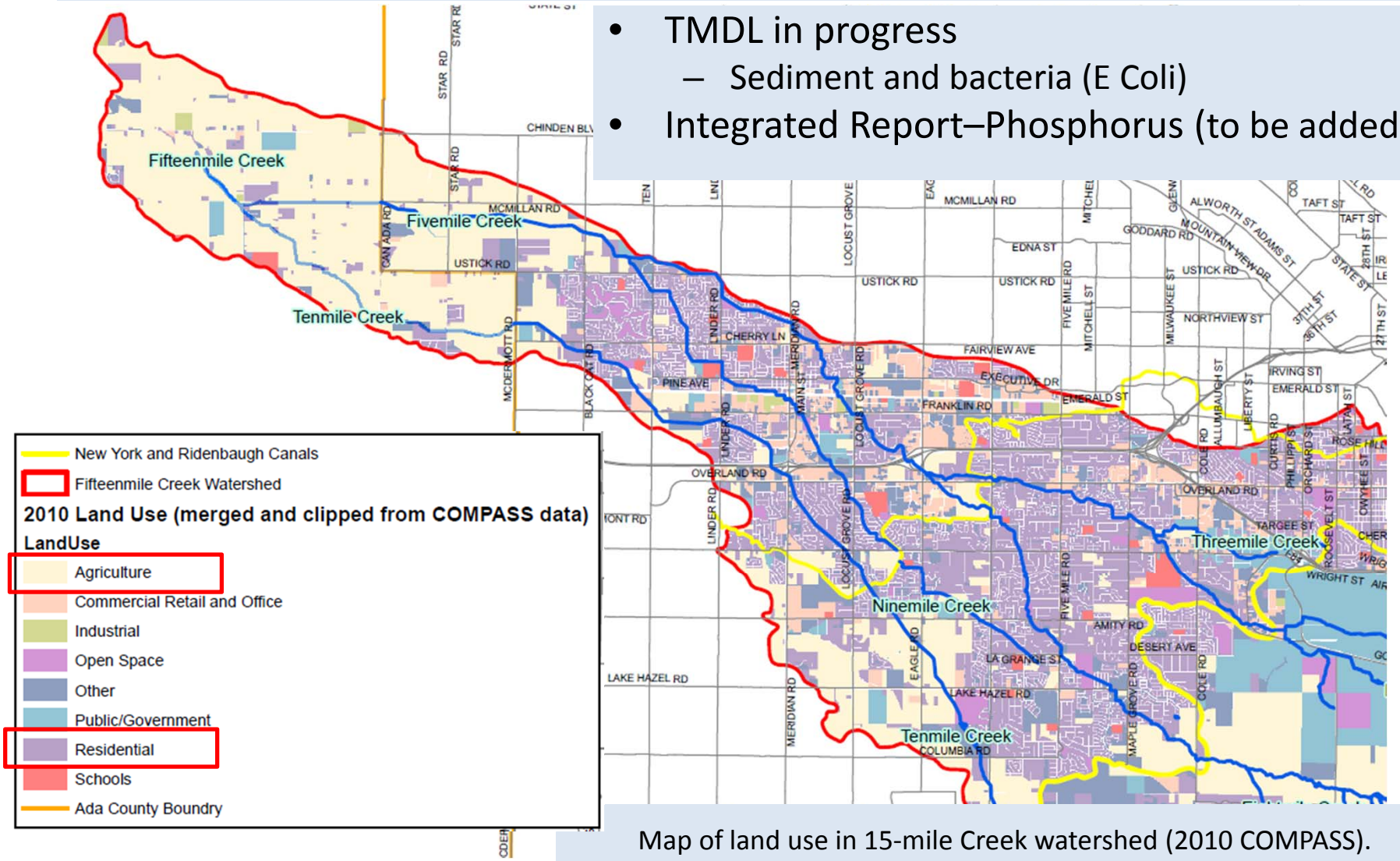




Maps from
Subbasin Assessment
IDEQ, December 2001

5-10-15 Mile Creek: Planned TMDLs

- TMDL in progress
  - Sediment and bacteria (E Coli)
- Integrated Report–Phosphorus (to be added?)

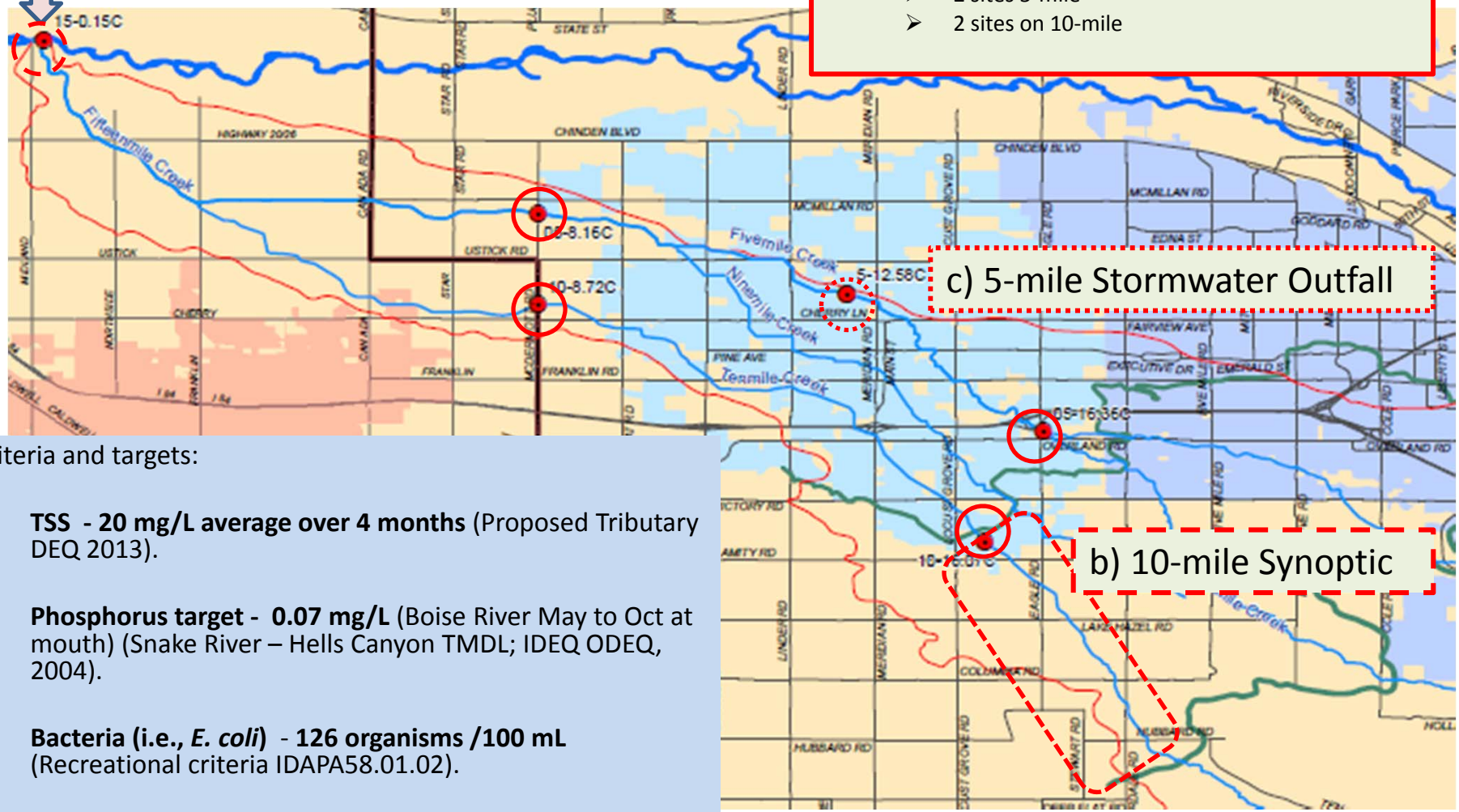


Map of land use in 15-mile Creek watershed (2010 COMPASS).

Sampling focused on TSS, TP and bacteria (i.e., *E. coli*)
…the Pollutants of Concern identified in
…ACHD's Phase II NPDES MS4 Permit (EPA 2009).

15-mile water quality (15-0.1C)
- USGS, ISDA and IDEQ

5 & 10 data from ACHD
a) Monthly (during irrigation season)
- 2 sites 5-mile
- 2 sites on 10-mile



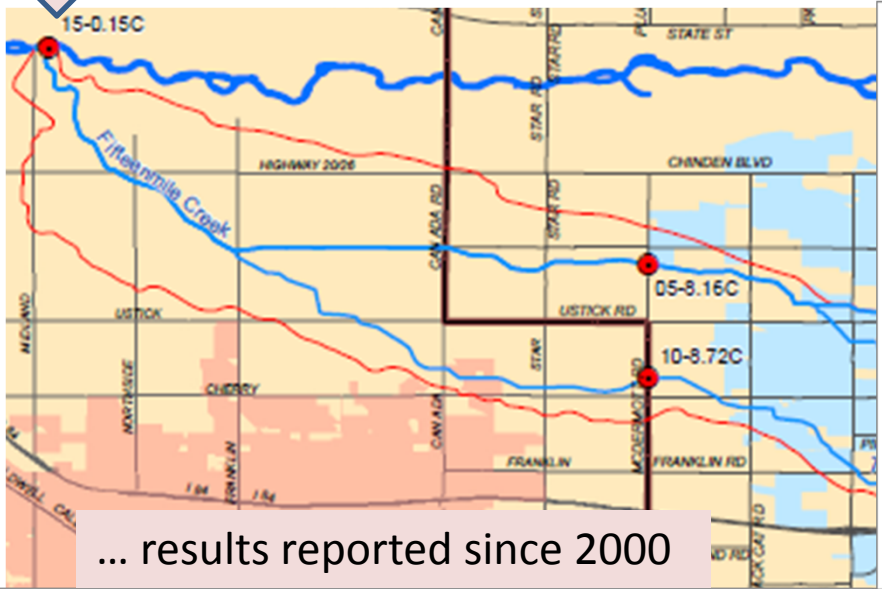
Criteria and targets:

- **TSS - 20 mg/L average over 4 months** (Proposed Tributary DEQ 2013).
- **Phosphorus target - 0.07 mg/L** (Boise River May to Oct at mouth) (Snake River – Hells Canyon TMDL; IDEQ ODEQ, 2004).
- **Bacteria (i.e., *E. coli*) - 126 organisms /100 mL** (Recreational criteria IDAPA58.01.02).

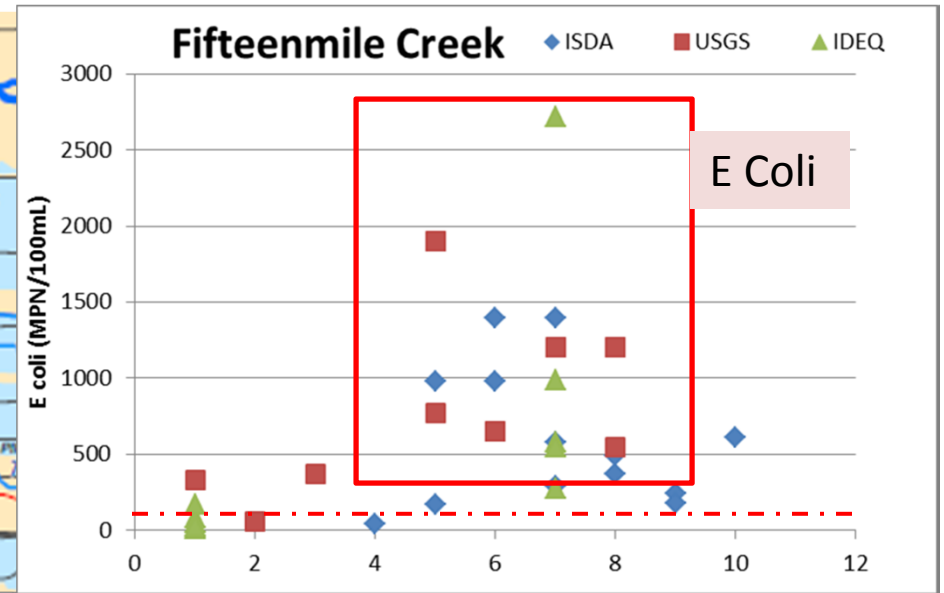
15-mile sampling

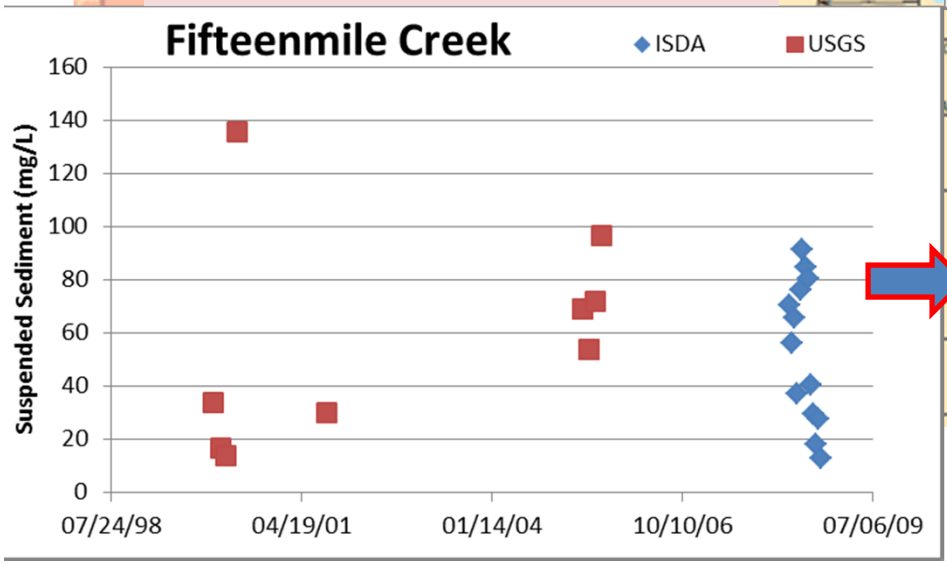
approximate sampling location at the mouth

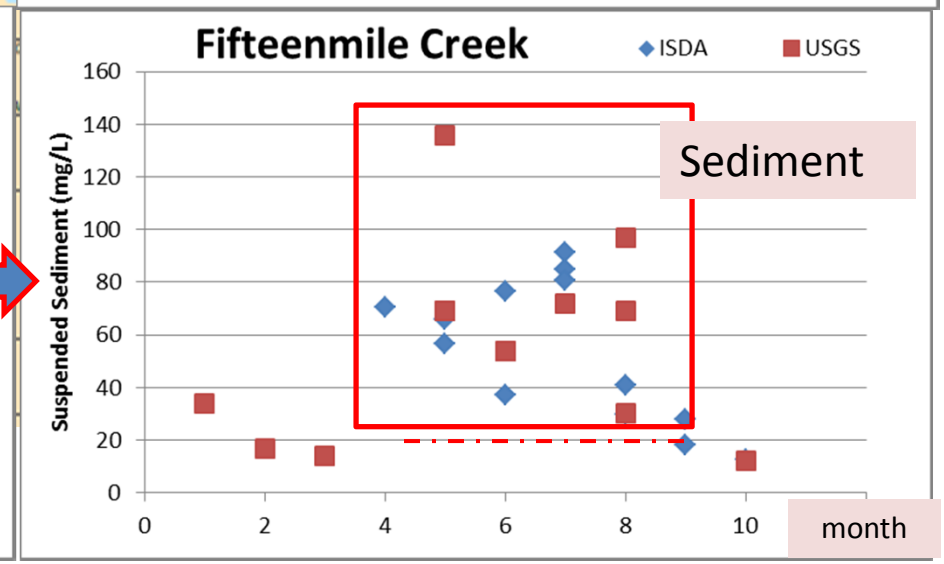
Highest sediment and E Coli
…observed during irrigation season



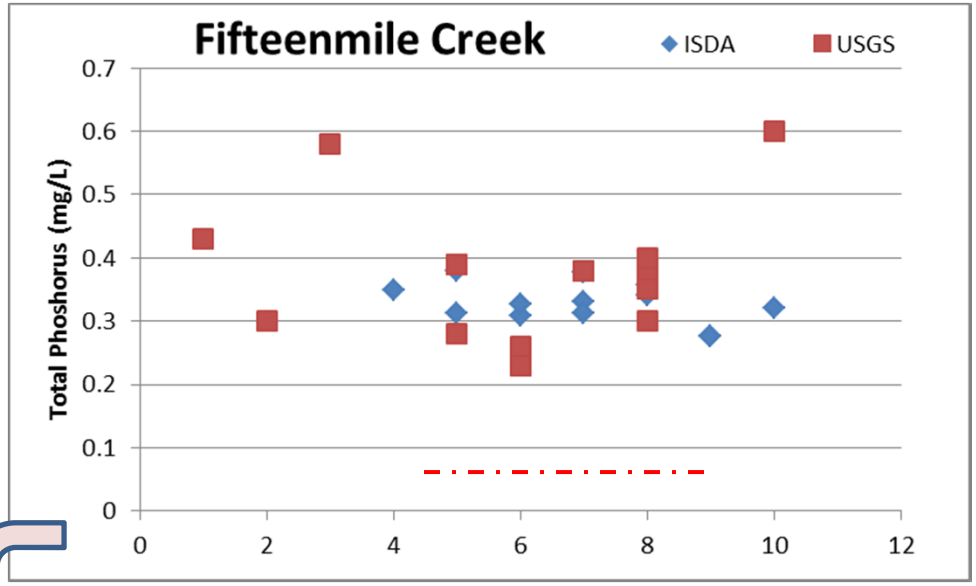
… results reported since 2000





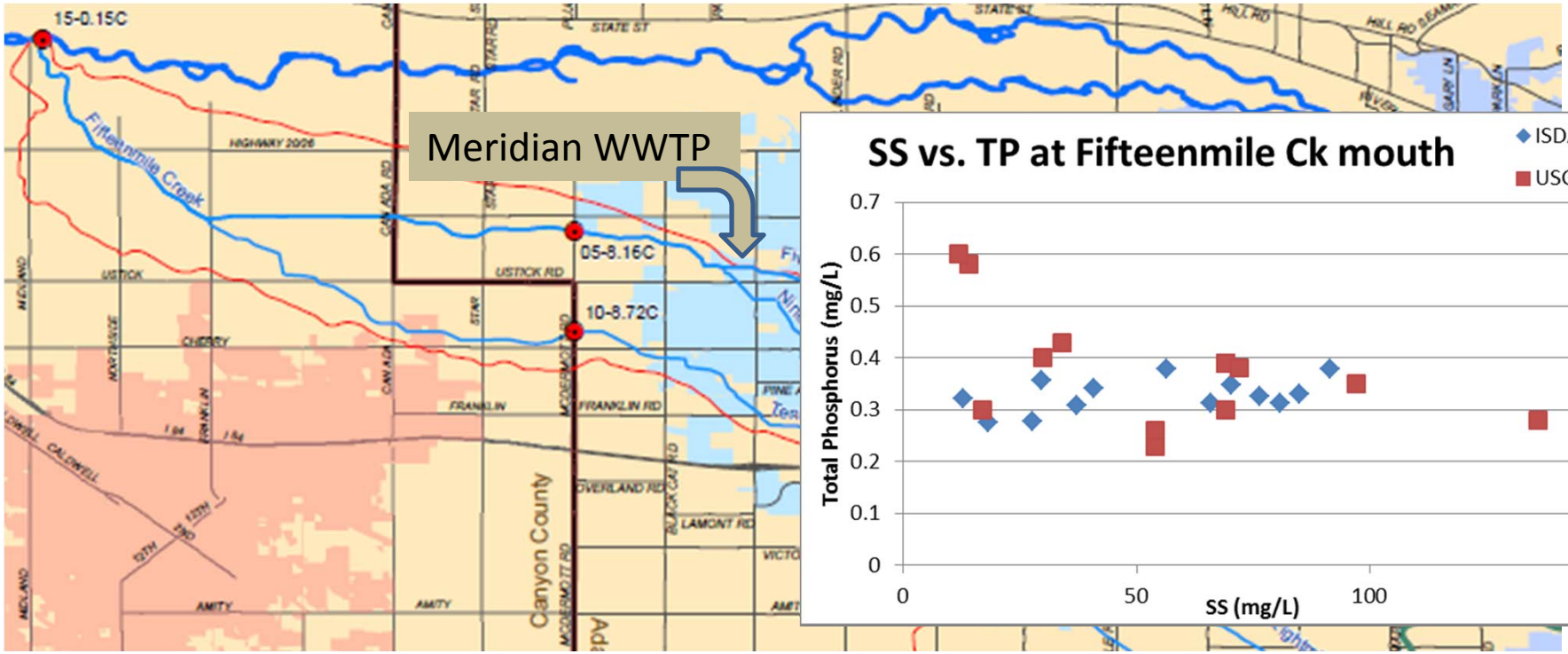


15-mile at mouth

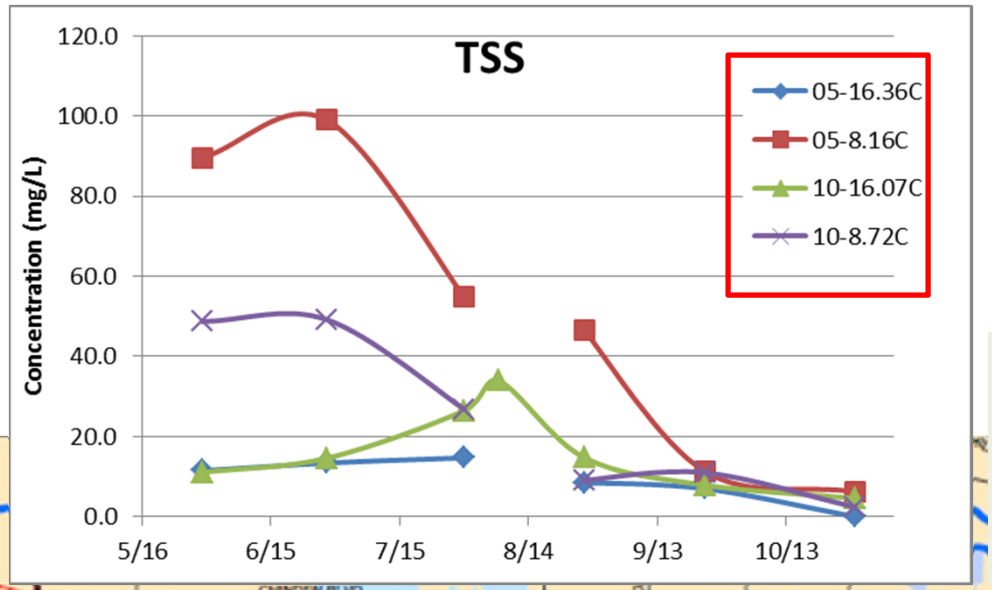


Note - highest TP levels in non-irrigation season

Note – not much correlation between SS and TP

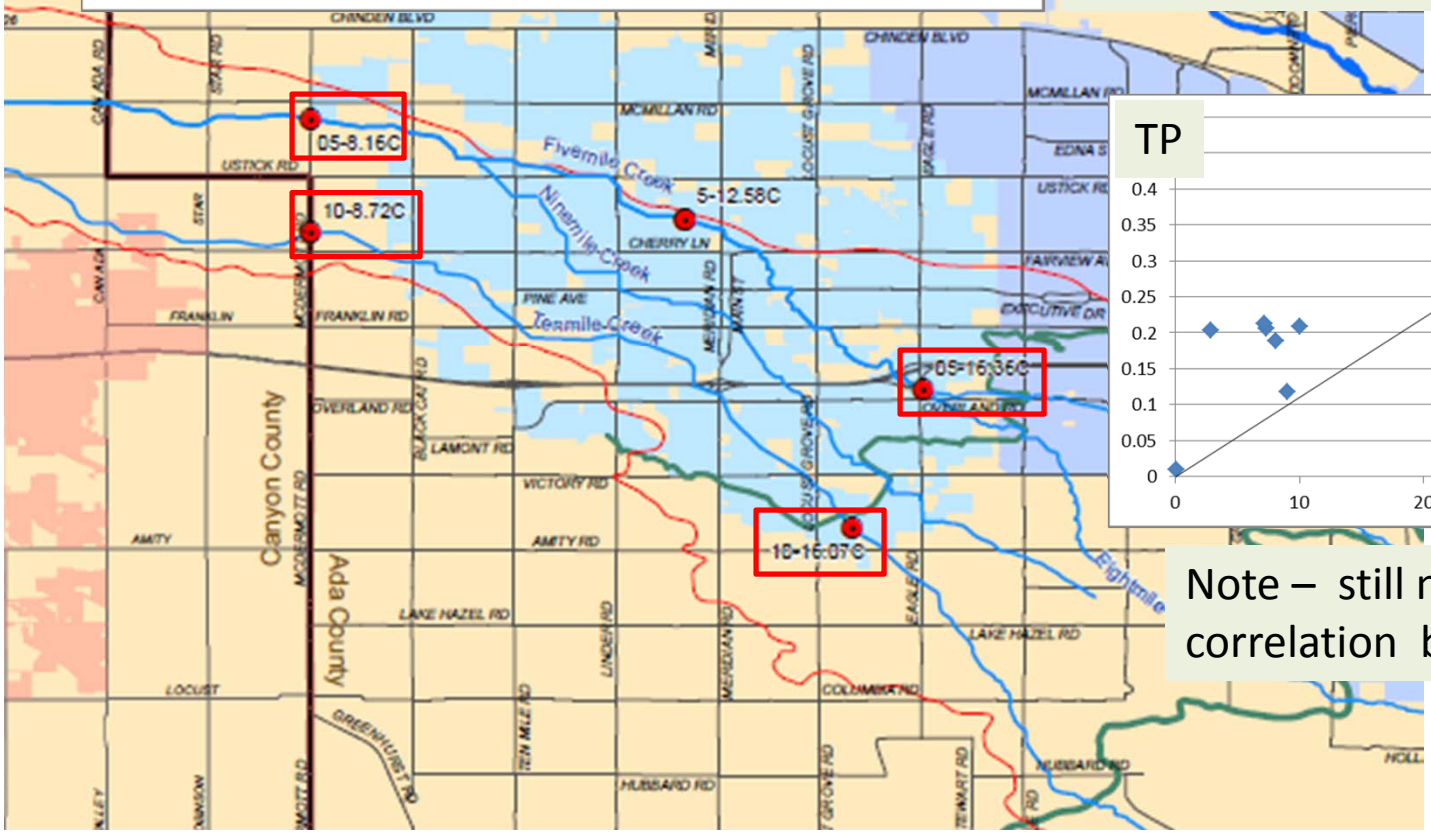


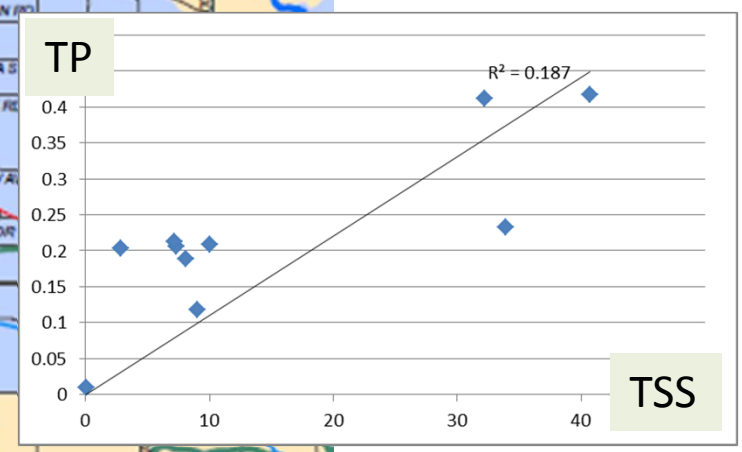
ACHD results: a) 5 & 10-mile



Note – TSS concentrations:

- generally lower later in summer
- generally above target at downstream sites



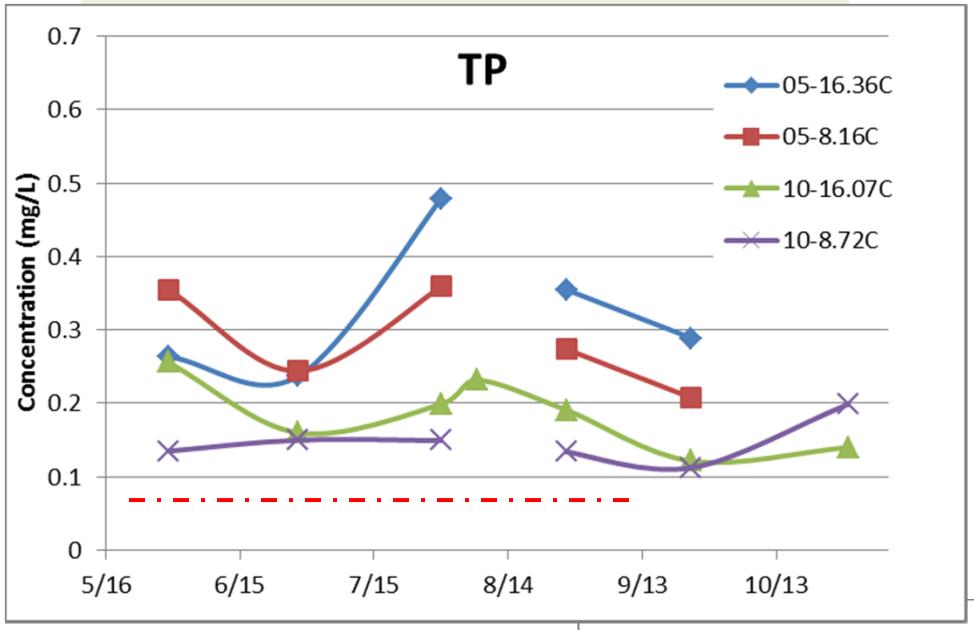


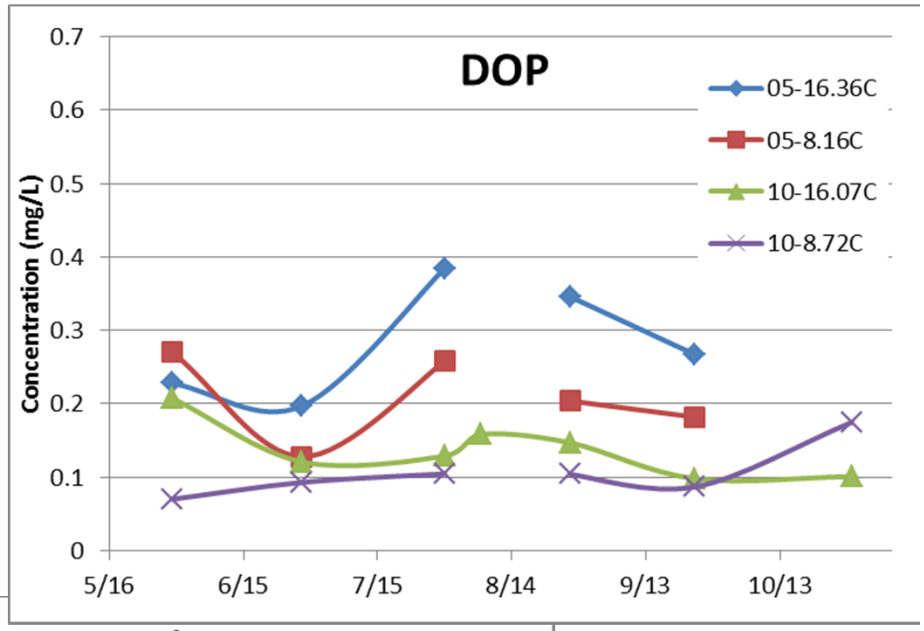
Note – still not much correlation between SS and TP

5 & 10-mile

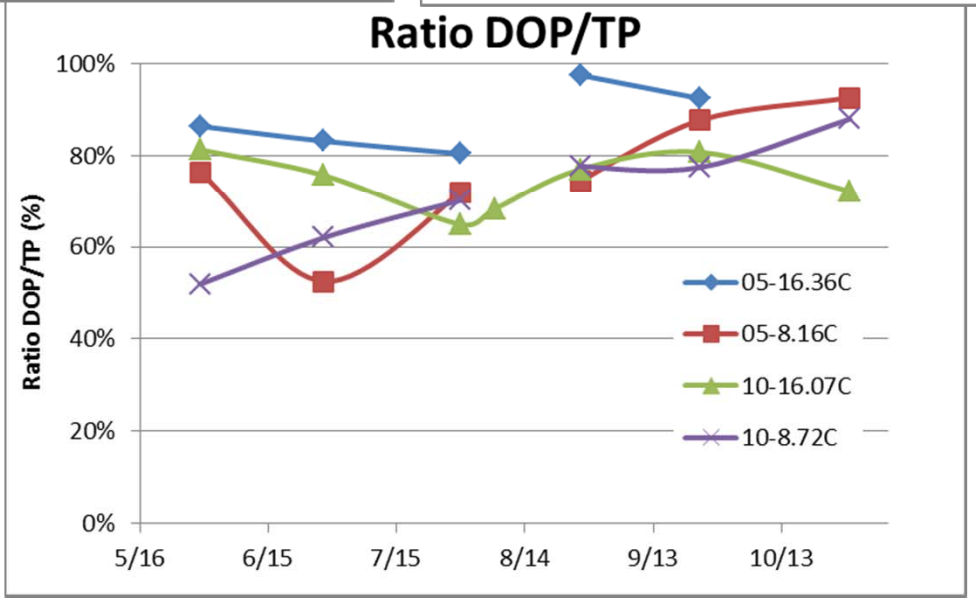
Note – TP concentrations:

- Above 0.07 target at all times

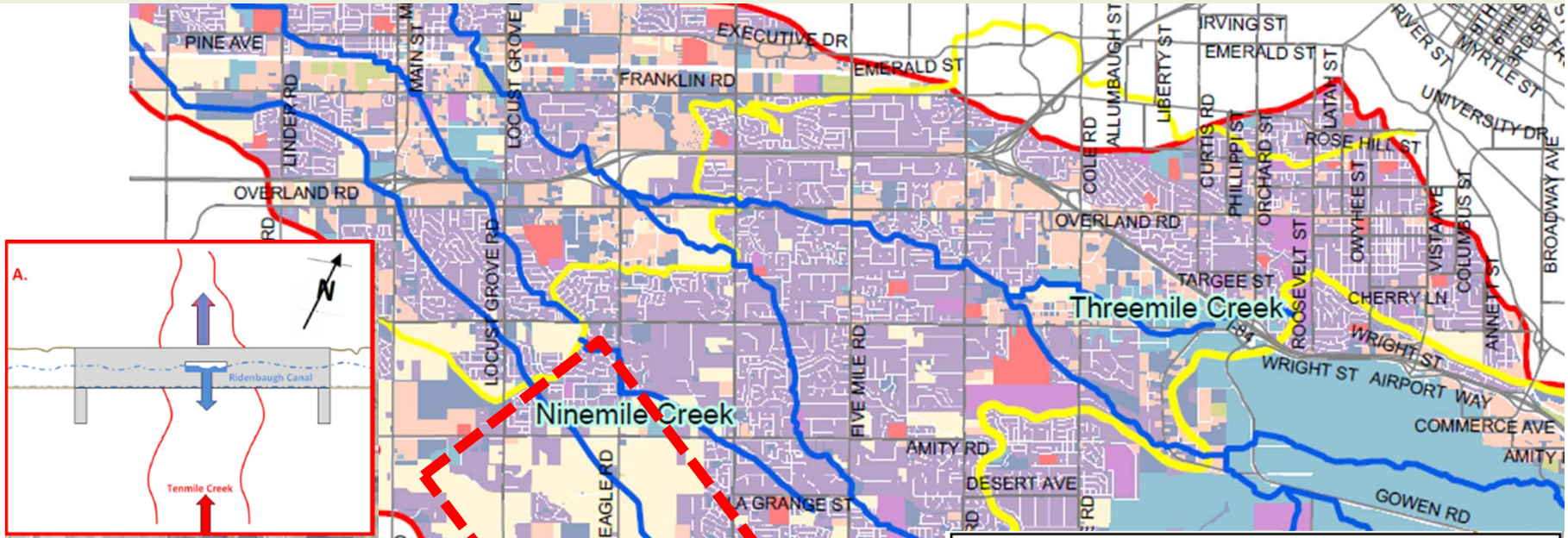




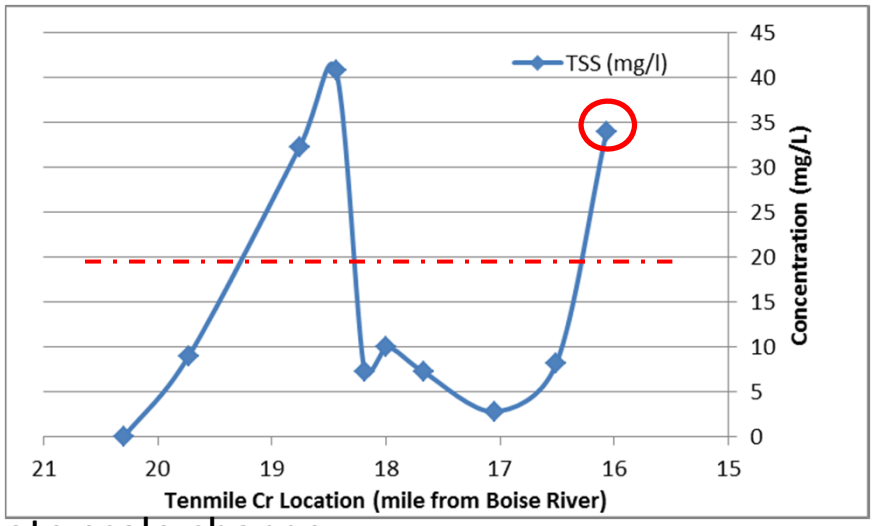
Note – ratio is fairly high and "trends" up



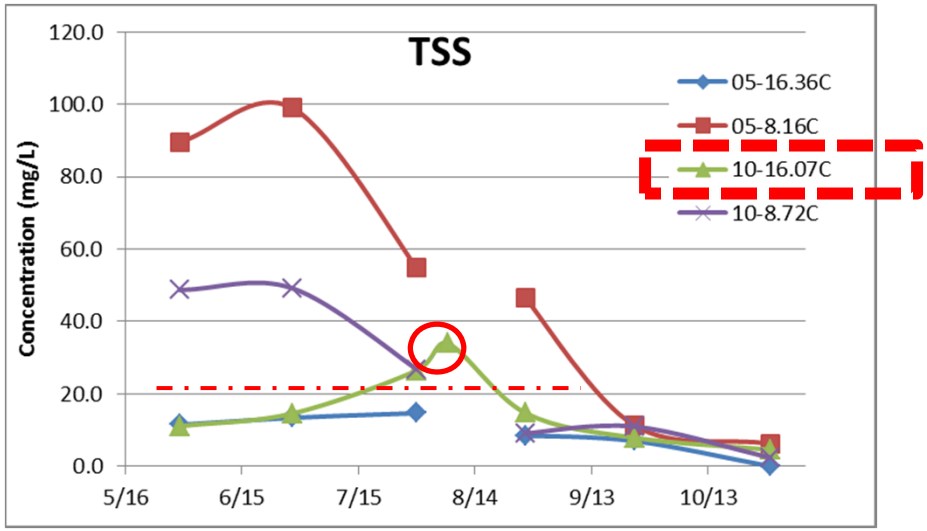
ACHD results:
b) 10-mile Synoptic (AM on August 7th)



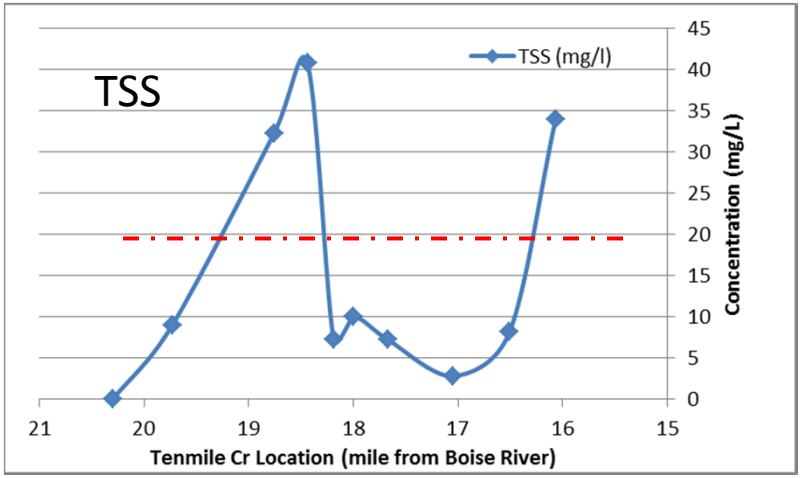
10-mile – New York Canal (creek mile 20.37) to Ridenbaugh Canal (creek mile 16.04; miles upstream of the Boise River confluence).

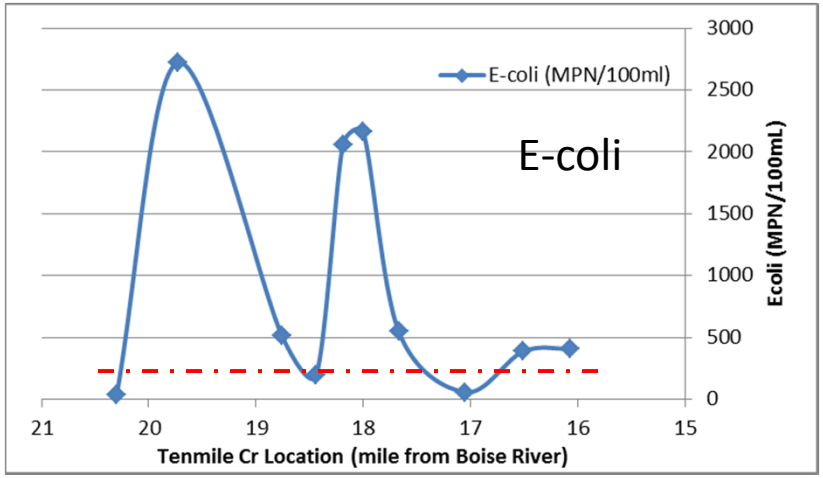


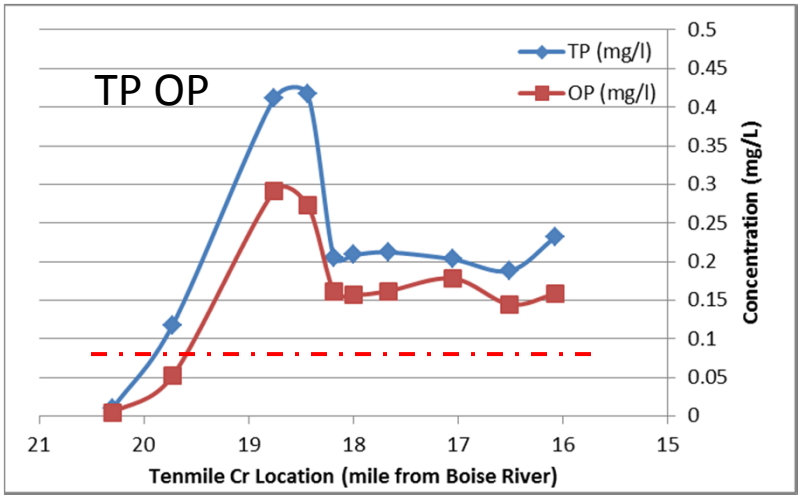
Note scale change

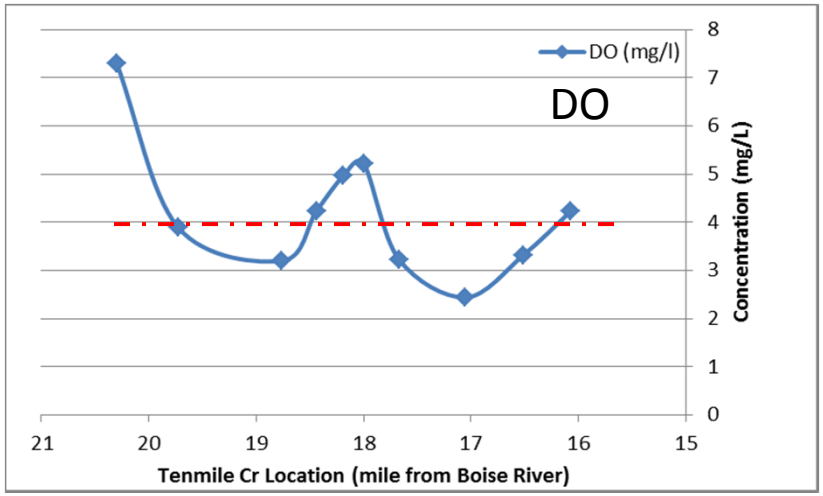


10-mile Synoptic Results









Note – often above criteria and not much correlation between parameters

10-mile mid-summer Synoptic

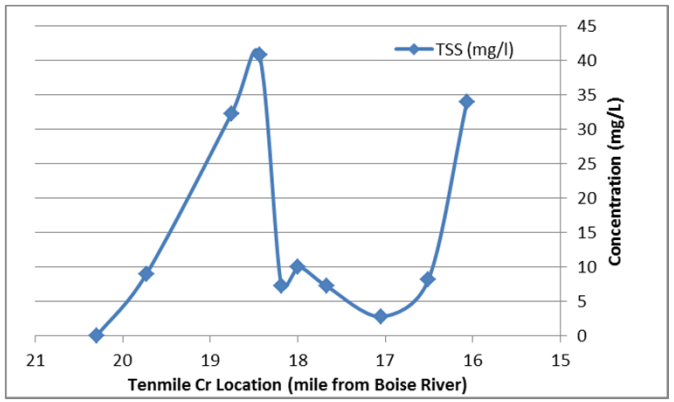
Results indicate:

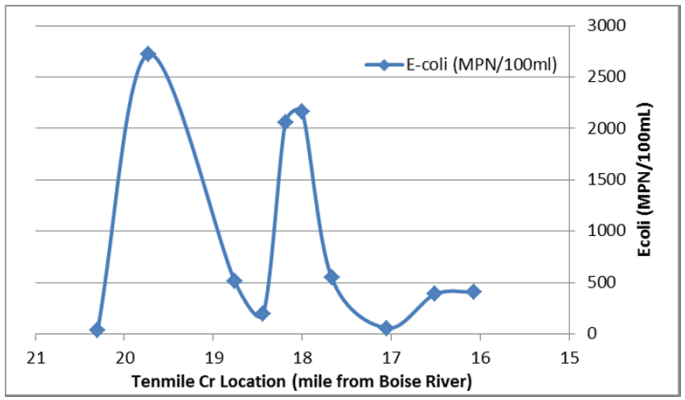
… relatively high longitudinal variation of all constituents

… almost no correlation of the water quality parameters

Based on these results, it is evident that…

"land uses are affecting water quality quite differently throughout this reach".





ACHD results:
c) storm drain outfall and 5-mile during rainfall

- Storm water quality samples
  - Chrisfield outfall water quality
  - 5-mile (just upstream of the outfall)
- Samples collected during rainfall events to assess influence of storm water on 5-mile water quality.

Catchment area is approximately 12 acres …consisting entirely of residential land use.

Date/Time	Total Suspended Solids (TSS) (mg/l)	Total Phosphorus (TP) (mg/l)	*E. coli* (MPN/100mL)
Chrisfield Outfall			
12/28/2011 3:24	25.3	0.455	8.6
3/25/2012 22:14	17.2	0.153	6.2
5/3/2012 11:52	28.2	0.706	1229.7
5/25/2012 8:37	16.8	0.281	866.4
10/16/2012 1:27	23.0	0.422	151.5
Median (Geomean)	23	0.422	*97.0*
In-stream			
12/28/2011 3:39	31.5	0.234	1046.2
3/25/2012 22:22	18.1	0.107	9600.0
5/3/2012 12:04	14.3	0.101	272.3
5/25/2012 8:50	17.1	0.225	816.4
10/16/2012 1:34	22.2	0.219	686.7
Median (Geomean)	18.1	0.219	*1089.2*

ACHD storm drain system outfall during rainfall events

Date/Time	Total Suspended Solids (TSS) (mg/l)	Total Phosphorus (TP) (mg/l)	*E. coli* (MPN/100mL)
Chrisfield Outfall			
Median (Geomean)	23	0.422	*97.0*
5-mile			
Median (Geomean)	18	0.219	*1089.2*

Results show

- TSS only slightly higher
- phosphorus from the residential outfall varied the greatest,
- geomean bacteria level lower.

Summary

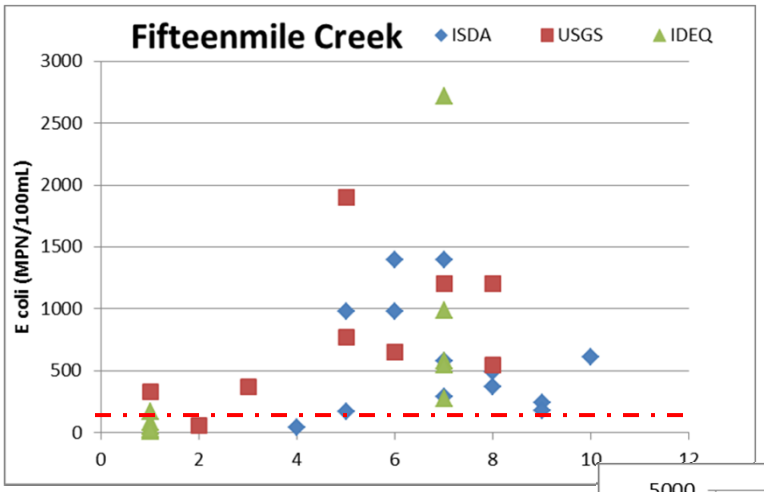
Concentrations are generally above:

- ✓ 20 mg/L TSS target
- ✓ 0.07 mg/L total phosphorus target
- ✓ 126 organisms /100 mL *E. coli Criteria*

WQ data provide an indication of how water quality varies throughout the summer (i.e., irrigation season) and watershed. Generally…

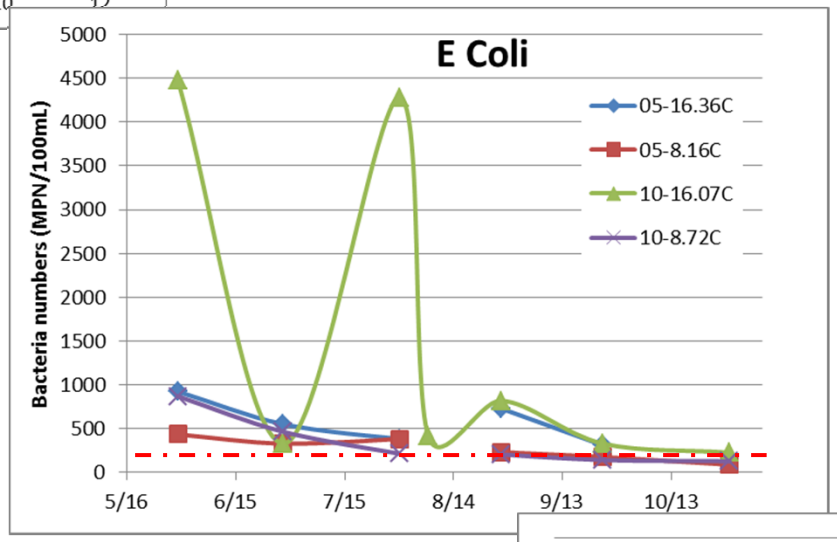
- TSS concentrations at downstream locations are higher in spring and decrease later in the summer
- Phosphorus concentrations
  - Fivemile Creek were similar to the concentrations reported for Fifteenmile Creek.
  - Tenmile Creek TP concentrations were generally lower
- Bacteria levels (i.e., *E. coli*) ranged in the 100's of counts /100mL, with a few sample in the 1000's of organisms /100 mL

Summary: Bacteria - E Coli



…only a few sample results below the
126 organisms /100 mL
recreational criteria (IDAPA58.01.02).

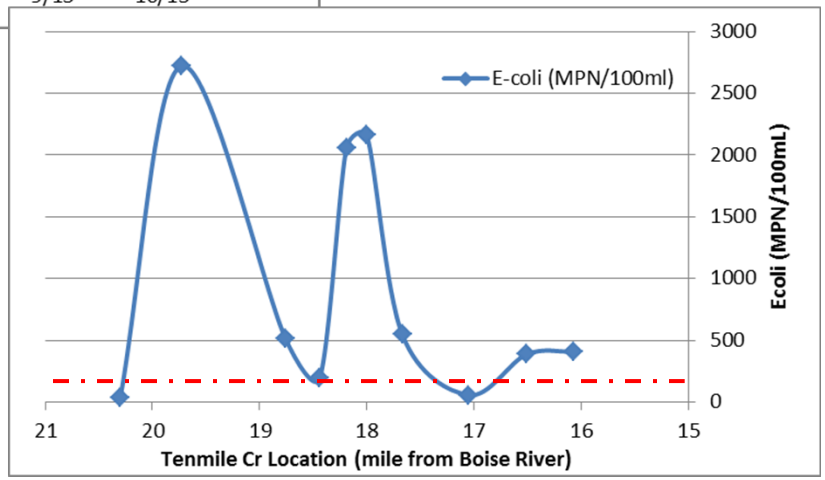
Criteria… is "geomean" based on 5 samples …. taken over a 30 day period.



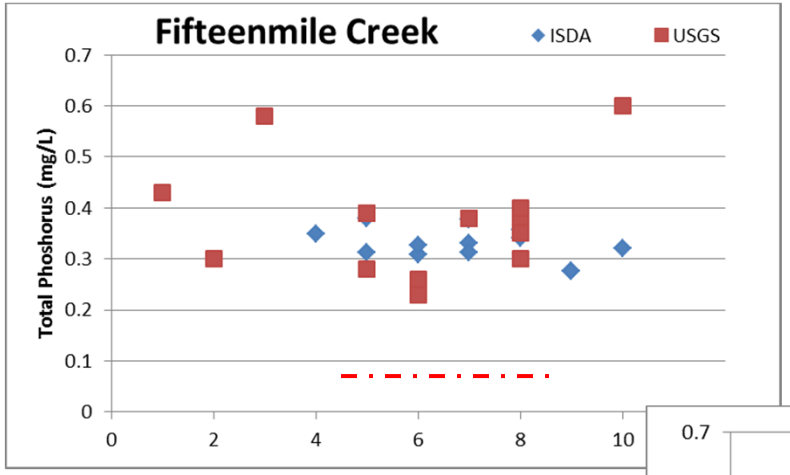
Wet Weather Results

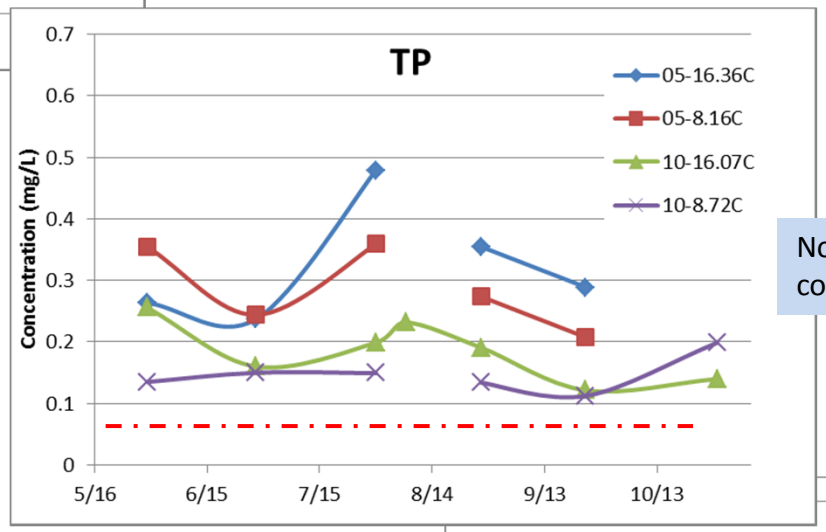
	Geomean E Coli
Chrisfield Outfall	*97.0*
In-stream	*1089.2*

… the bacteria levels (i.e., *E. coli*) ranged in the 100's of counts /100mL, with a few sample in the 1000's of organisms /100 mL



Summary: Phosphorus



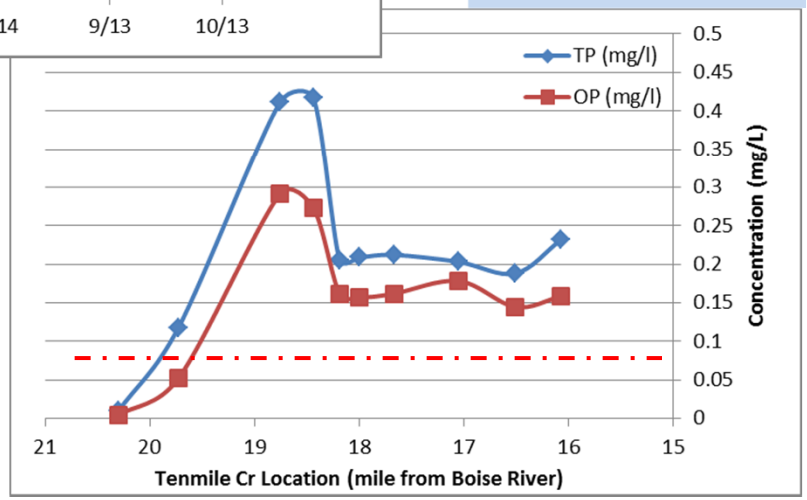


Note higher upstream compared to downstream!!

Wet Weather Results

	Median TP
Chrisfield Outfall	0.422
In-stream	0.219

Note scale change

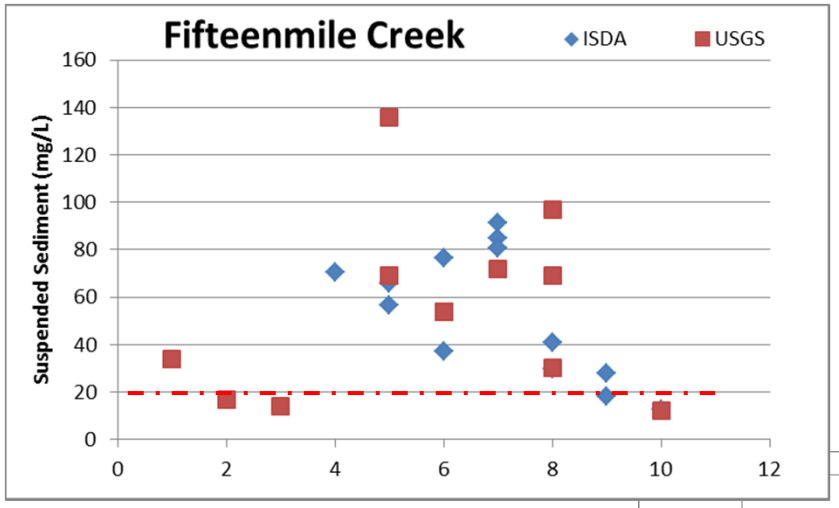


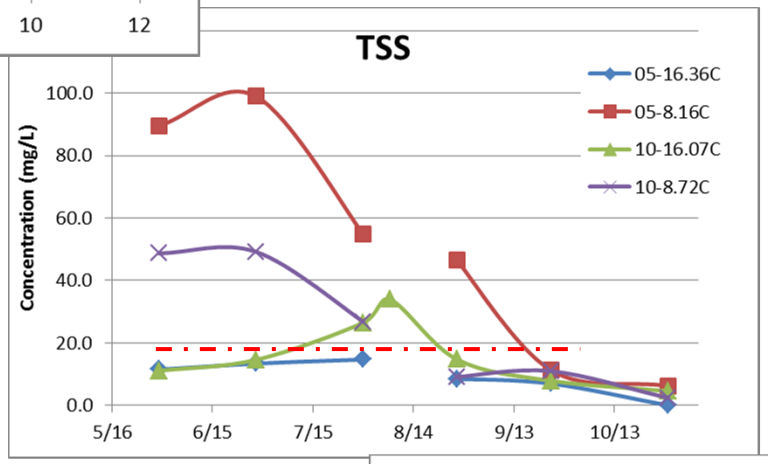
TP concentrations :

- 5-mile similar to the concentrations reported for 15-mile
- 10-mile generally lower

Summary: SS and TSS

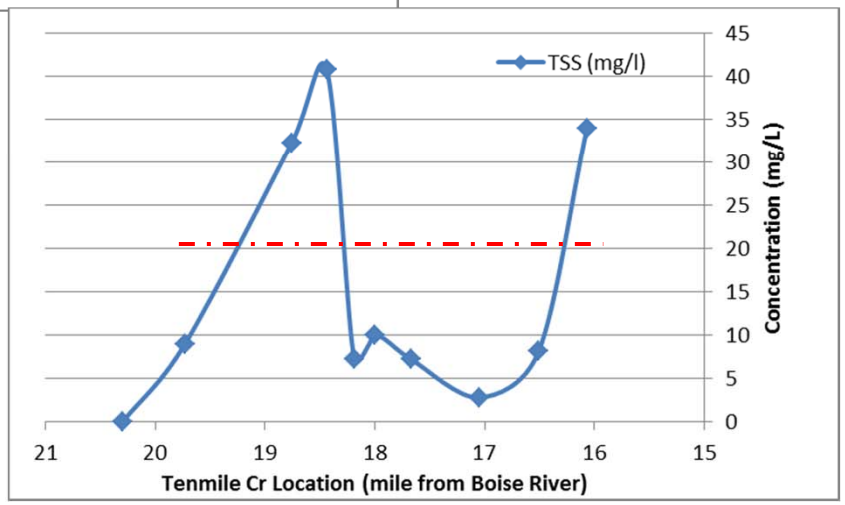
Note scale changes!!





Wet Weather Results

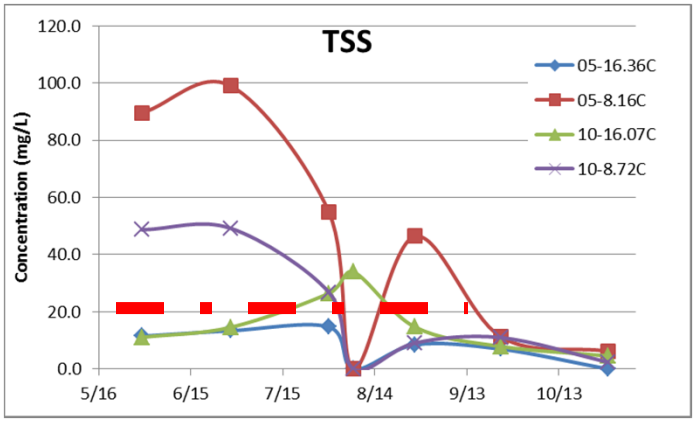
	Median TSS
Chrisfield Outfall	23
In-stream	18.1



TSS concentrations

- at downstream locations are higher
- higher in the spring and gradually decrease later in the summer
- consistent with USGS (2012) and ISDA (2009) SS data showing higher levels in the summer

One more comment: 5 & 10-mile "Average maximum TSS" varying over time period….



Proposed TSS target:
20 mg/L for
~120 day average…

5 & 10-mile data

	05-16.36C	05-8.16C	10-16.07C	10-8.72C
5/30/2012	11.5	89.5	11.1	48.7
6/28/2012	13.4	99.0	14.6	49.2
7/30/2012	14.7	54.8	26.5	26.8
8/7/2012	--	--	33.9	--
8/27/2012	8.5	46.4	14.7	9.1
9/24/2012	7.0	11.3	7.9	11.0
10/29/2012	--	6.3	4.6	2.4
POR Average	**11.0**	**51.2**	**16.2**	**24.5**
4-month Avg	11.0	60.2	18.1	29.0
3-month Avg	13.2	81.1	25.0	41.6
2-month Avg	14.1	94.3	30.2	49.0
Max Month	14.7	99.0	33.9	49.2

Questions???

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- ✓ 0.07 mg/L total phosphorus target
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- TP concentrations
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- Bacteria levels (i.e., *E. coli*) ranged in the 100's of counts /100mL, with a few sample in the 1000's of organisms /100 mL