Tucannon/Pataha Watershed TMDL

Where are we at &
Where are we going

Photo of Tucannon River near Territorial Road Bridge taken by HDR, 7/25/2005

WASHINGTON STATE DEPARTMENT OF ECOLOGY

WHY DO TMDL'S?

- It's the law

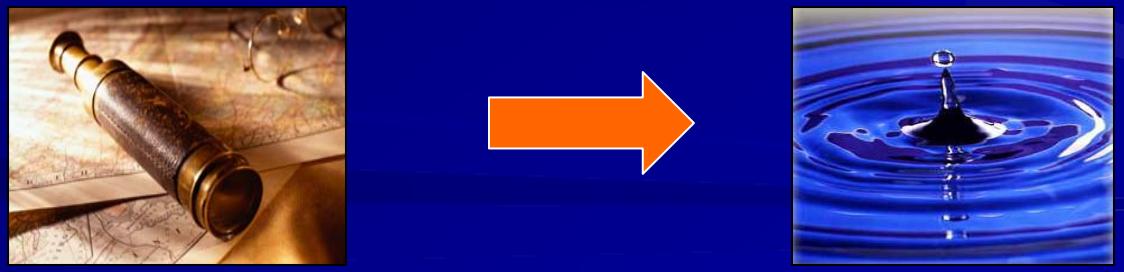
- EPA lawsuit

- Clean Water !

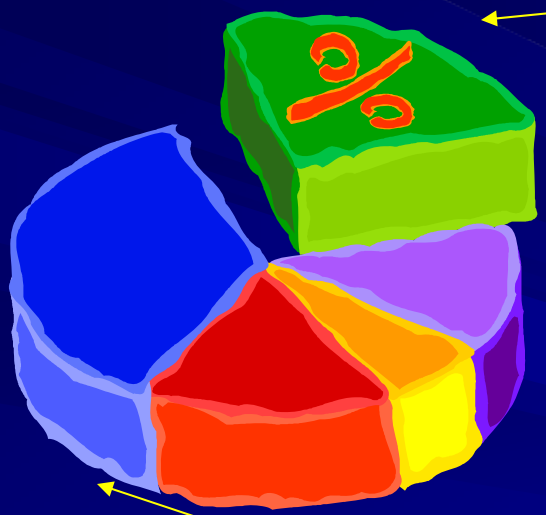
WHAT IS A TMDL?

- Total Maximum Daily Load

- Water Clean-up Plan

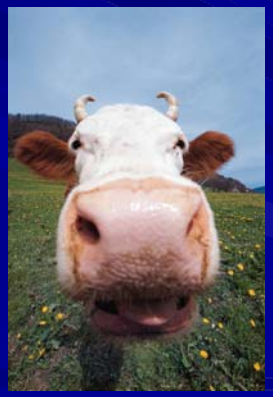


THE POLLUTION PIE



Point-source

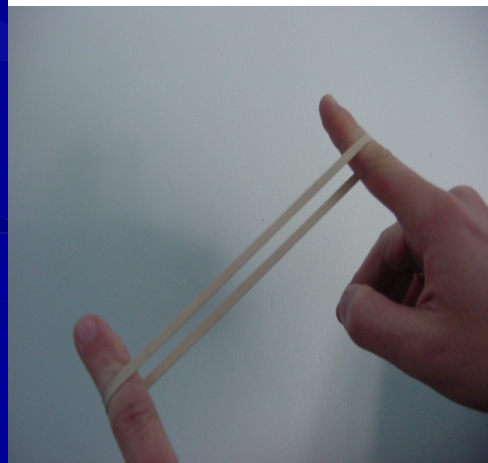
Non-point source

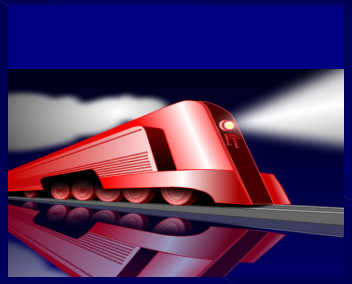



FLAMMABLE
CUYAHOGA
RIVER

ISSUES WITH TMDLs

- More time spent planning, less doing
- Duplicative of other planning processes
- Regulator centric = stretched resources





STREAMLINED TMDL

- Data Collection
- TMDL Reports
- Management Focused
- Implementation Ongoing

WHY HERE?

- Mostly non-point sources
- Small watersheds
- Data already exists
- Implementation happening

TMDL Development Strategy

- Address comments on the 2005 HDR study.
- Analysis of existing data for Pataha Creek.
- Complete the required TMDL elements.

Comments on 2005 Study

- Discussion needed for system potential vegetation analysis.
- Question about water withdrawls assumptions.
- What was the effect of the 2005 ‘School House’ fire.
- The Qual2K model analysis needed a verification model run.

Why was the 2005 study not ready for submittal?

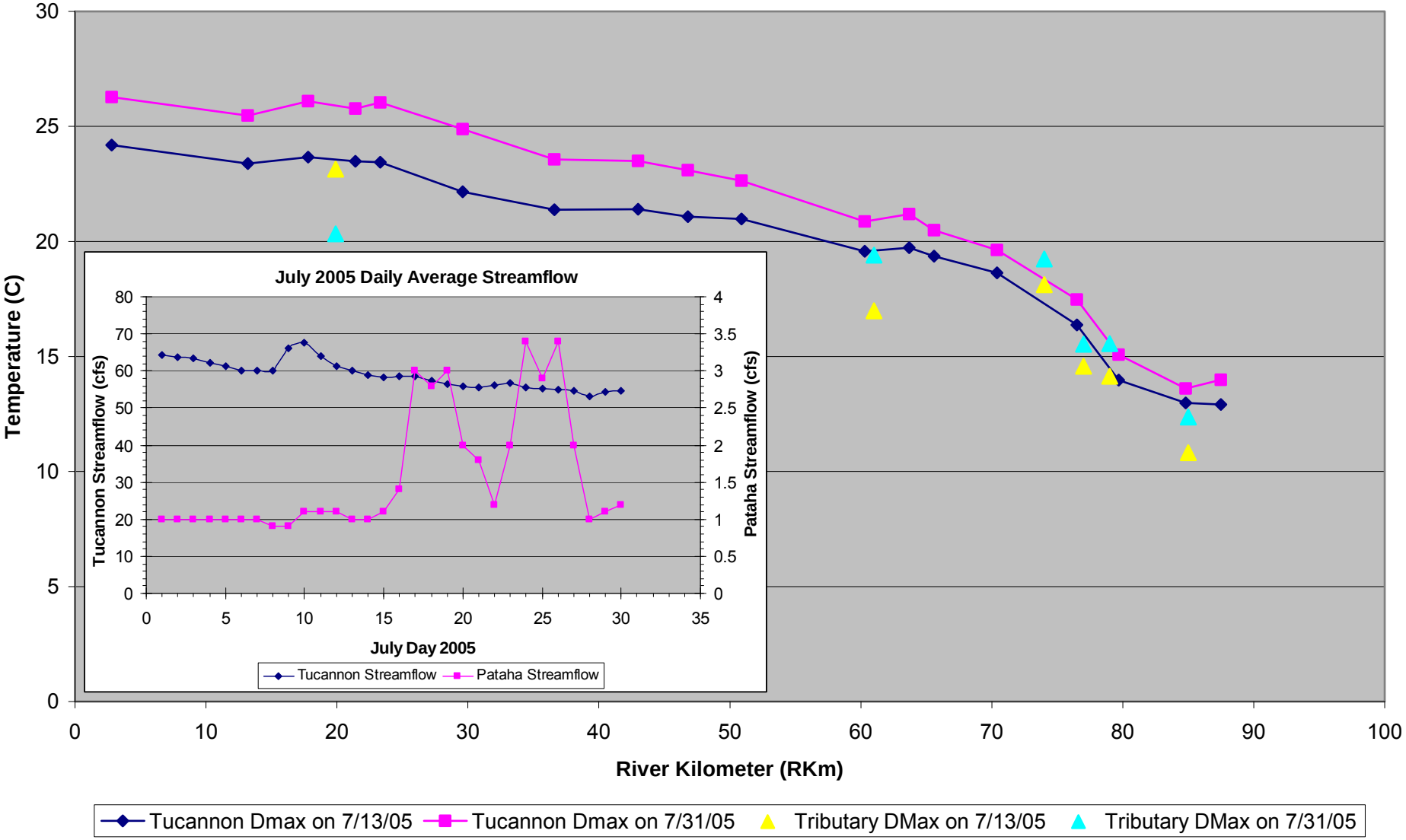
- A TMDL requirements not included:
  - A discussion of seasonal variation and address potential issues related to climate change.
  - Load and waste load allocations
  - Margin of Safety
  - Summary Implementation Strategy

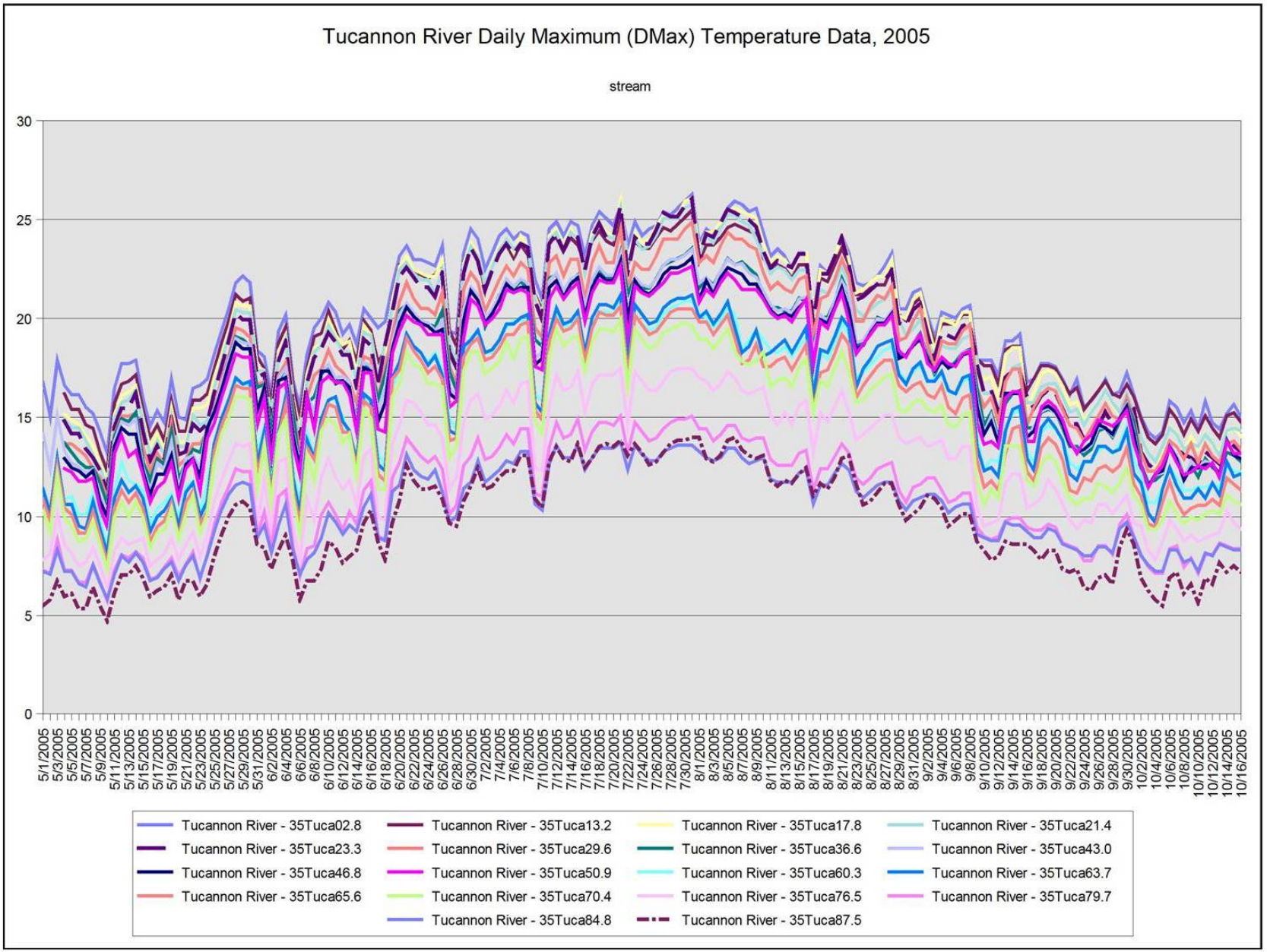
So what do we know so far?

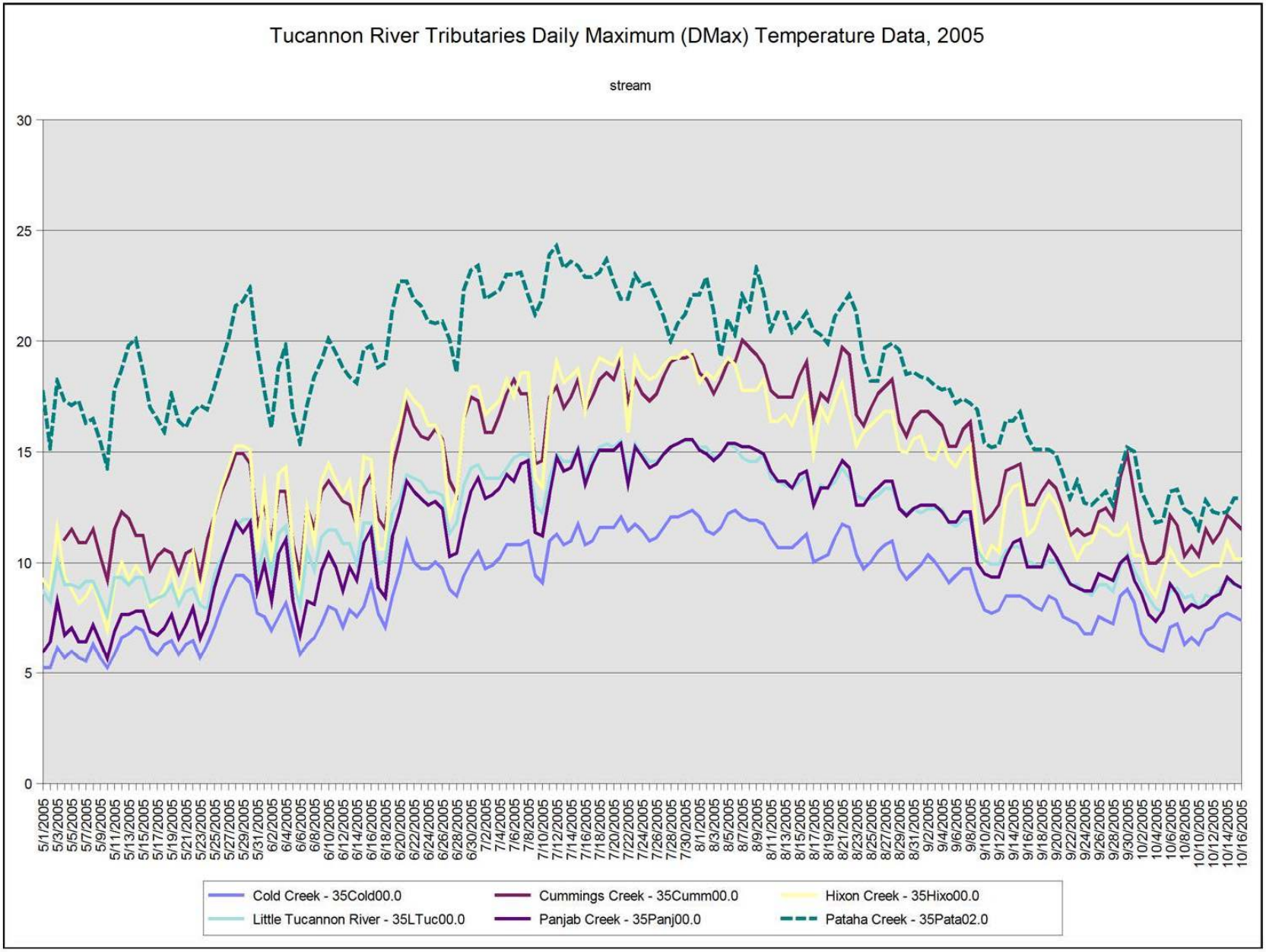
Stream Temperatures

- Warmest day (7/31) vs. Model Day (7/13)
- Tributary affect on Tucannon
- Temperatures During Schoolhouse Fire

Comparison of Daily Maximum (DMax) Stream Temperatures for Tucannon River and Tributaries




Tucannon River Daily Maximum (DMax) Temperature Data, 2005
stream
30
25
20
15
10
5
0
5/1/2005
5/3/2005
5/5/2005
5/7/2005
5/9/2005
5/11/2005
5/13/2005
5/15/2005
5/17/2005
5/19/2005
5/21/2005
5/23/2005
5/25/2005
5/27/2005
5/29/2005
5/31/2005
6/2/2005
6/4/2005
6/6/2005
6/8/2005
6/10/2005
6/12/2005
6/14/2005
6/16/2005
6/18/2005
6/20/2005
6/22/2005
6/24/2005
6/26/2005
6/28/2005
6/30/2005
7/2/2005
7/4/2005
7/6/2005
7/8/2005
7/10/2005
7/12/2005
7/14/2005
7/16/2005
7/18/2005
7/20/2005
7/22/2005
7/24/2005
7/26/2005
7/28/2005
7/30/2005
8/1/2005
8/3/2005
8/5/2005
8/7/2005
8/9/2005
8/11/2005
8/13/2005
8/15/2005
8/17/2005
8/19/2005
8/21/2005
8/23/2005
8/25/2005
8/27/2005
8/29/2005
8/31/2005
9/2/2005
9/4/2005
9/6/2005
9/8/2005
9/10/2005
9/12/2005
9/14/2005
9/16/2005
9/18/2005
9/20/2005
9/22/2005
9/24/2005
9/26/2005
9/28/2005
9/30/2005
10/2/2005
10/4/2005
10/6/2005
10/8/2005
10/10/2005
10/12/2005
10/14/2005
10/16/2005
Tucannon River - 35Tuca02.8
Tucannon River - 35Tuca13.2
Tucannon River - 35Tuca17.8
Tucannon River - 35Tuca21.4
Tucannon River - 35Tuca23.3
Tucannon River - 35Tuca29.6
Tucannon River - 35Tuca36.6
Tucannon River - 35Tuca43.0
Tucannon River - 35Tuca46.8
Tucannon River - 35Tuca50.9
Tucannon River - 35Tuca60.3
Tucannon River - 35Tuca63.7
Tucannon River - 35Tuca65.6
Tucannon River - 35Tuca70.4
Tucannon River - 35Tuca76.5
Tucannon River - 35Tuca79.7
Tucannon River - 35Tuca84.8
Tucannon River - 35Tuca87.5


Tucannon River Tributaries Daily Maximum (DMax) Temperature Data, 2005
stream
30
25
20
15
10
5
0
5/1/2005
5/3/2005
5/5/2005
5/7/2005
5/9/2005
5/11/2005
5/13/2005
5/15/2005
5/17/2005
5/19/2005
5/21/2005
5/23/2005
5/25/2005
5/27/2005
5/29/2005
5/31/2005
6/2/2005
6/4/2005
6/6/2005
6/8/2005
6/10/2005
6/12/2005
6/14/2005
6/16/2005
6/18/2005
6/20/2005
6/22/2005
6/24/2005
6/26/2005
6/28/2005
6/30/2005
7/2/2005
7/4/2005
7/6/2005
7/8/2005
7/10/2005
7/12/2005
7/14/2005
7/16/2005
7/18/2005
7/20/2005
7/22/2005
7/24/2005
7/26/2005
7/28/2005
7/30/2005
8/1/2005
8/3/2005
8/5/2005
8/7/2005
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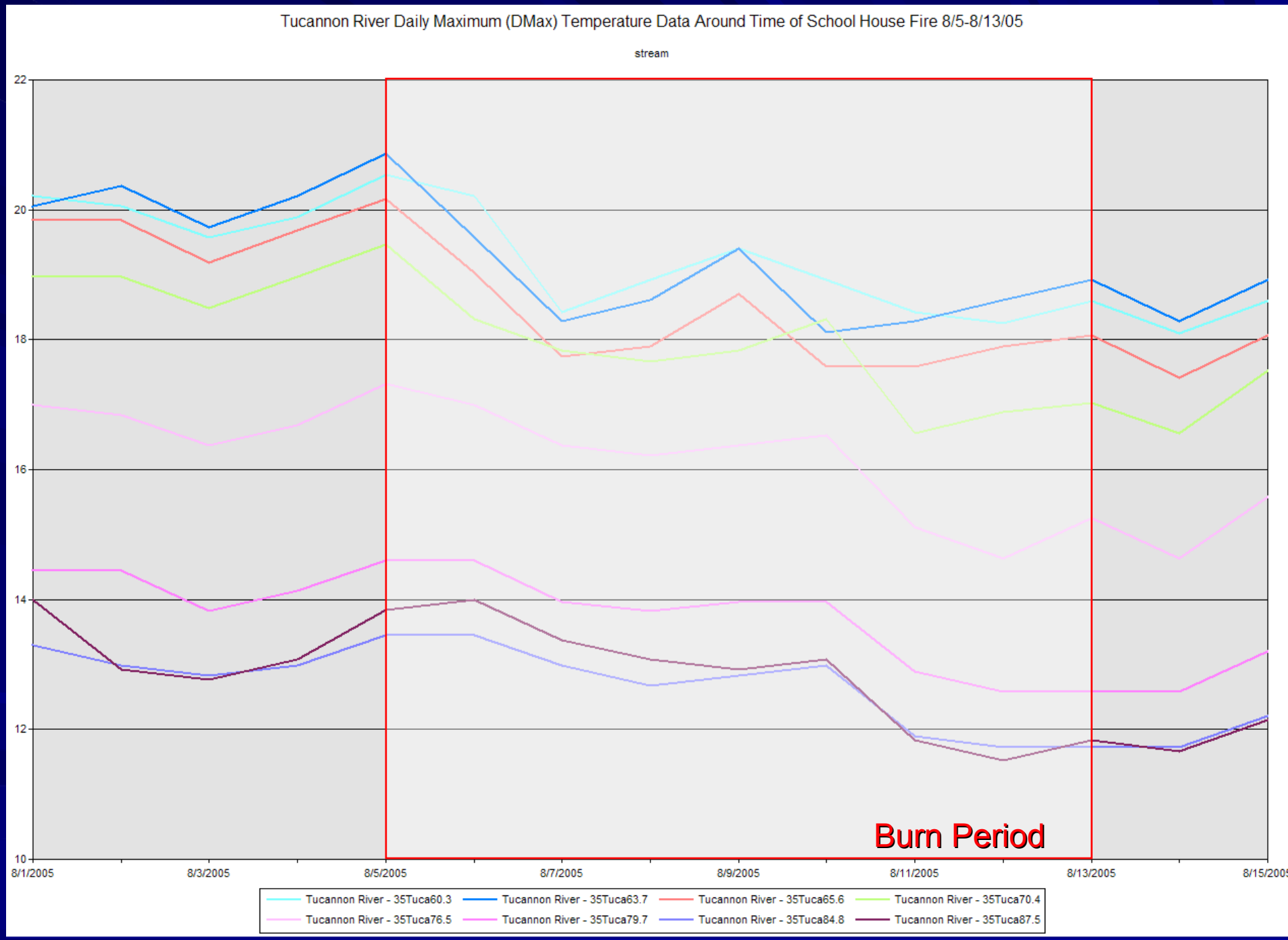
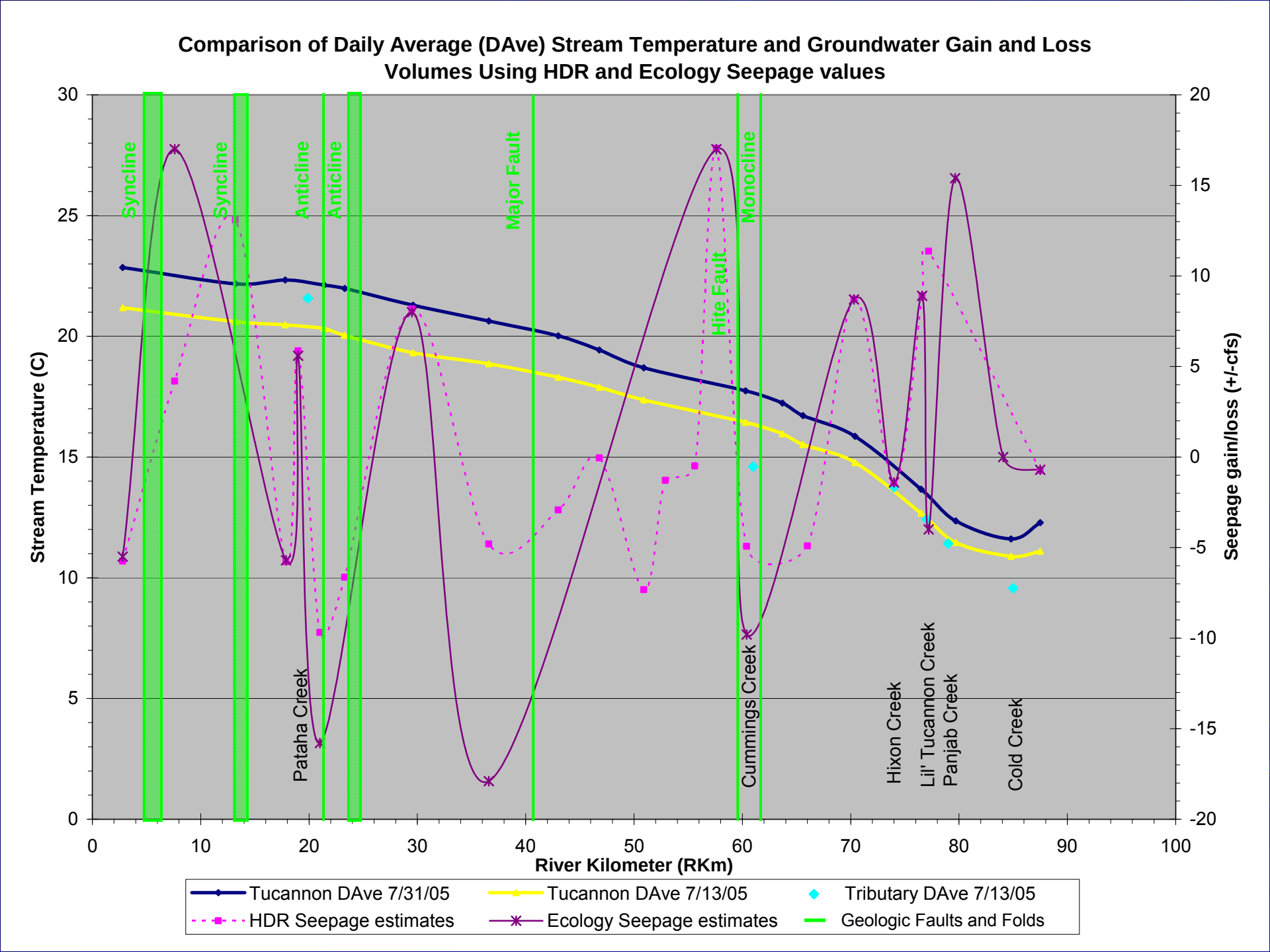
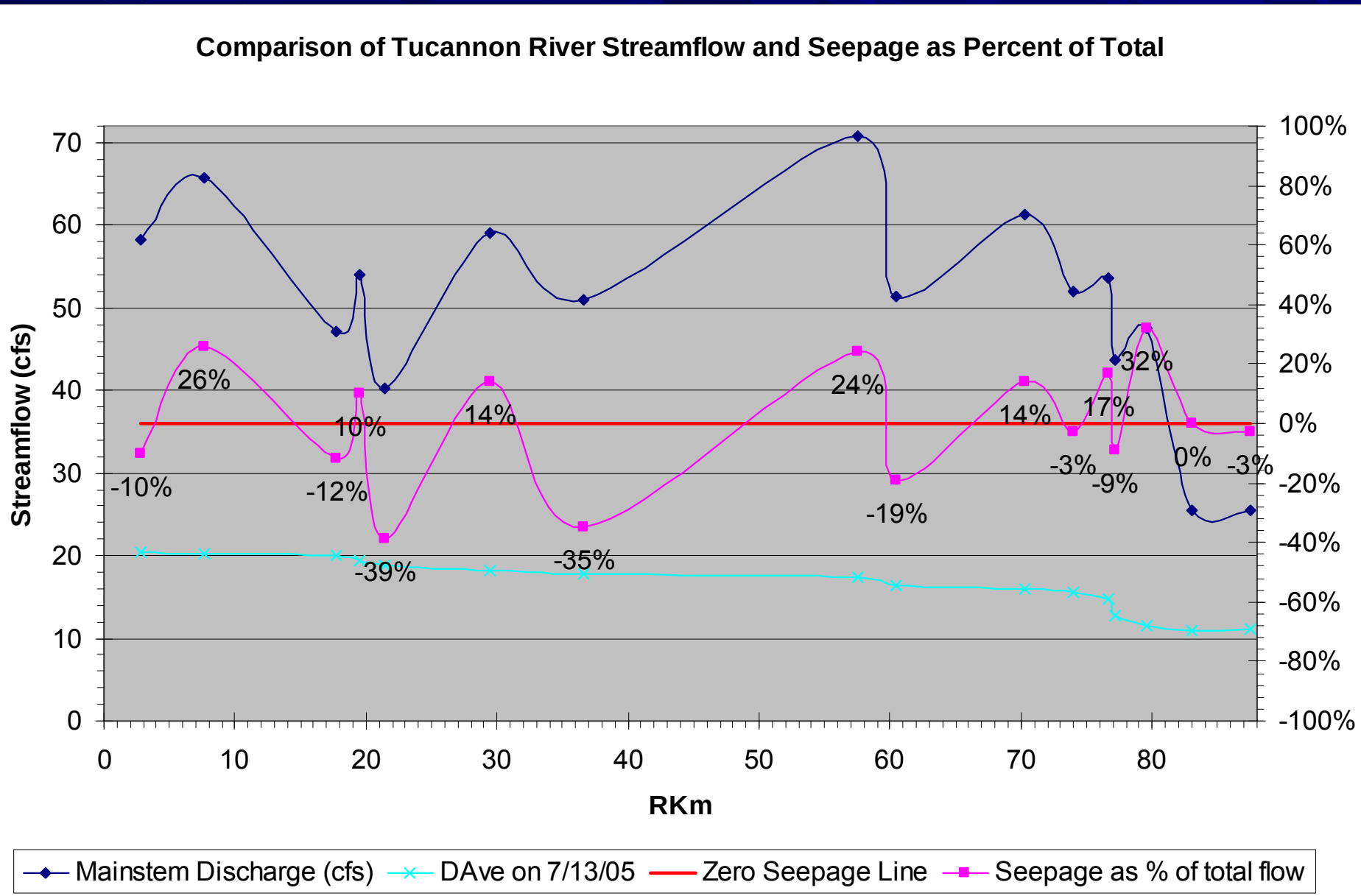
8/11/2005
8/13/2005
8/15/2005
8/17/2005
8/19/2005
8/21/2005
8/23/2005
8/25/2005
8/27/2005
8/29/2005
8/31/2005
9/2/2005
9/4/2005
9/6/2005
9/8/2005
9/10/2005
9/12/2005
9/14/2005
9/16/2005
9/18/2005
9/20/2005
9/22/2005
9/24/2005
9/26/2005
9/28/2005
9/30/2005
10/2/2005
10/4/2005
10/6/2005
10/8/2005
10/10/2005
10/12/2005
10/14/2005
10/16/2005
Cold Creek - 35Cold00.0
Cummings Creek - 35Cumm00.0
Hixon Creek - 35Hixo00.0
Little Tucannon River - 35LTuc00.0
Panjab Creek - 35Panj00.0
Pataha Creek - 35Pata02.0

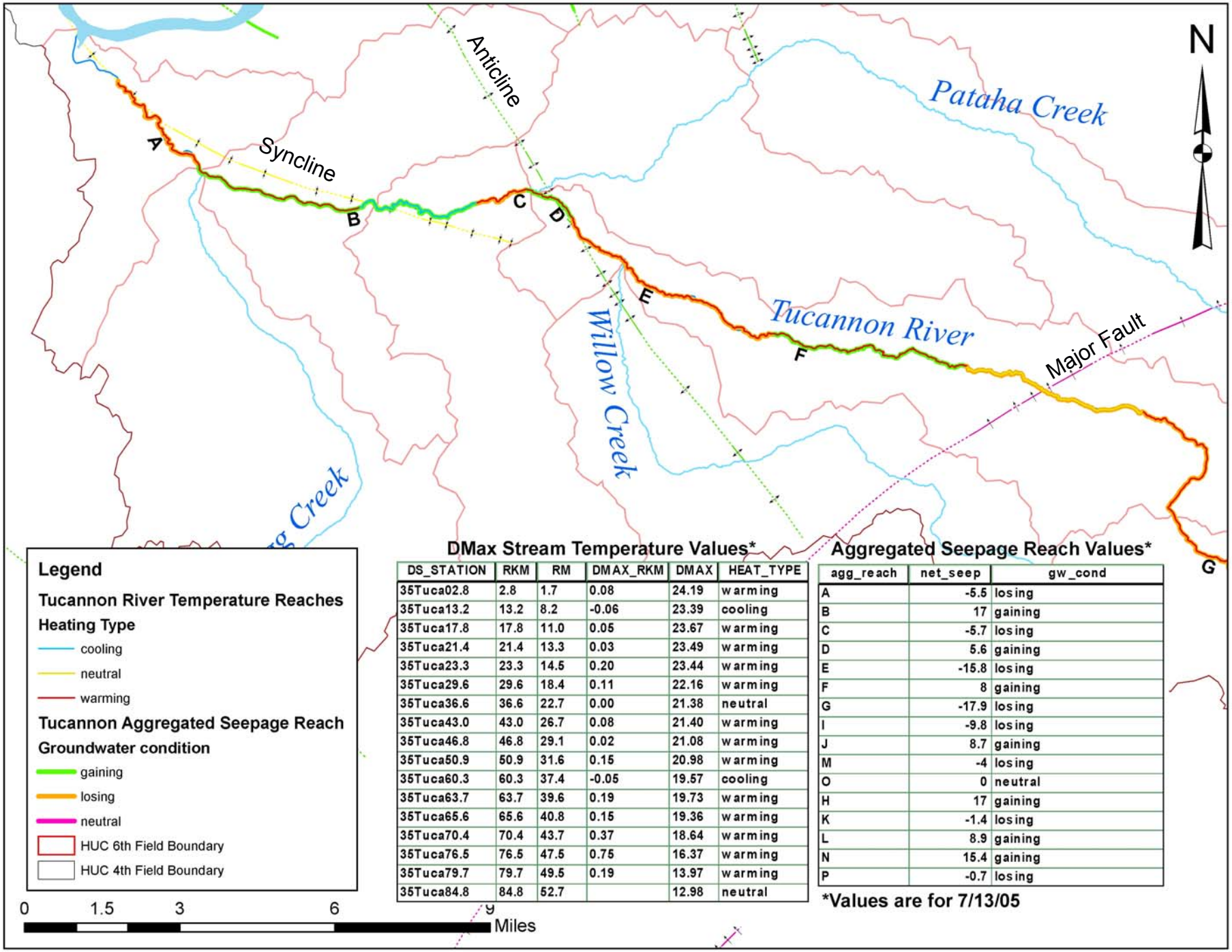

Tucannon River Daily Maximum (DMax) Temperature Data Around Time of School House Fire 8/5-8/13/05
stream
22
20
18
16
14
12
10
8/1/2005
8/3/2005
8/5/2005
8/7/2005
8/9/2005
8/11/2005
8/13/2005
8/15/2005
Burn Period
Tucannon River - 35Tuca60.3
Tucannon River - 35Tuca63.7
Tucannon River - 35Tuca65.6
Tucannon River - 35Tuca70.4
Tucannon River - 35Tuca76.5
Tucannon River - 35Tuca79.7
Tucannon River - 35Tuca84.8
Tucannon River - 35Tuca87.5

Seepage Survey Data

- Comments about the seepage survey have been addressed
  - Estimated sprinkler usage vs. water right claims and metering database
  - Seepage results make sense with the existing knowledge of the watershed's hydrogeology


Comparison of Daily Average (DAve) Stream Temperature and Groundwater Gain and Loss Volumes Using HDR and Ecology Seepage values
Stream Temperature (C)
Seepage gain/loss (+/-cfs)
River Kilometer (RKm)
Syncline
Syncline
Anticline
Anticline
Major Fault
Hite Fault
Monocline
Pataha Creek
Cummings Creek
Hixon Creek
Lil' Tucannon Creek
Panjab Creek
Cold Creek
Tucannon DAve 7/31/05
Tucannon DAve 7/13/05
Tributary DAve 7/13/05
HDR Seepage estimates
Ecology Seepage estimates
Geologic Faults and Folds


Comparison of Tucannon River Streamflow and Seepage as Percent of Total
Streamflow (cfs)
RKm
0
10
20
30
40
50
60
70
80
100%
80%
60%
40%
20%
0%
-20%
-40%
-60%
-80%
-100%
-10%
26%
-12%
10%
-39%
14%
-35%
24%
-19%
14%
-3%
17%
-9%
32%
0%
-3%
Mainstem Discharge (cfs)
DAve on 7/13/05
Zero Seepage Line
Seepage as % of total flow



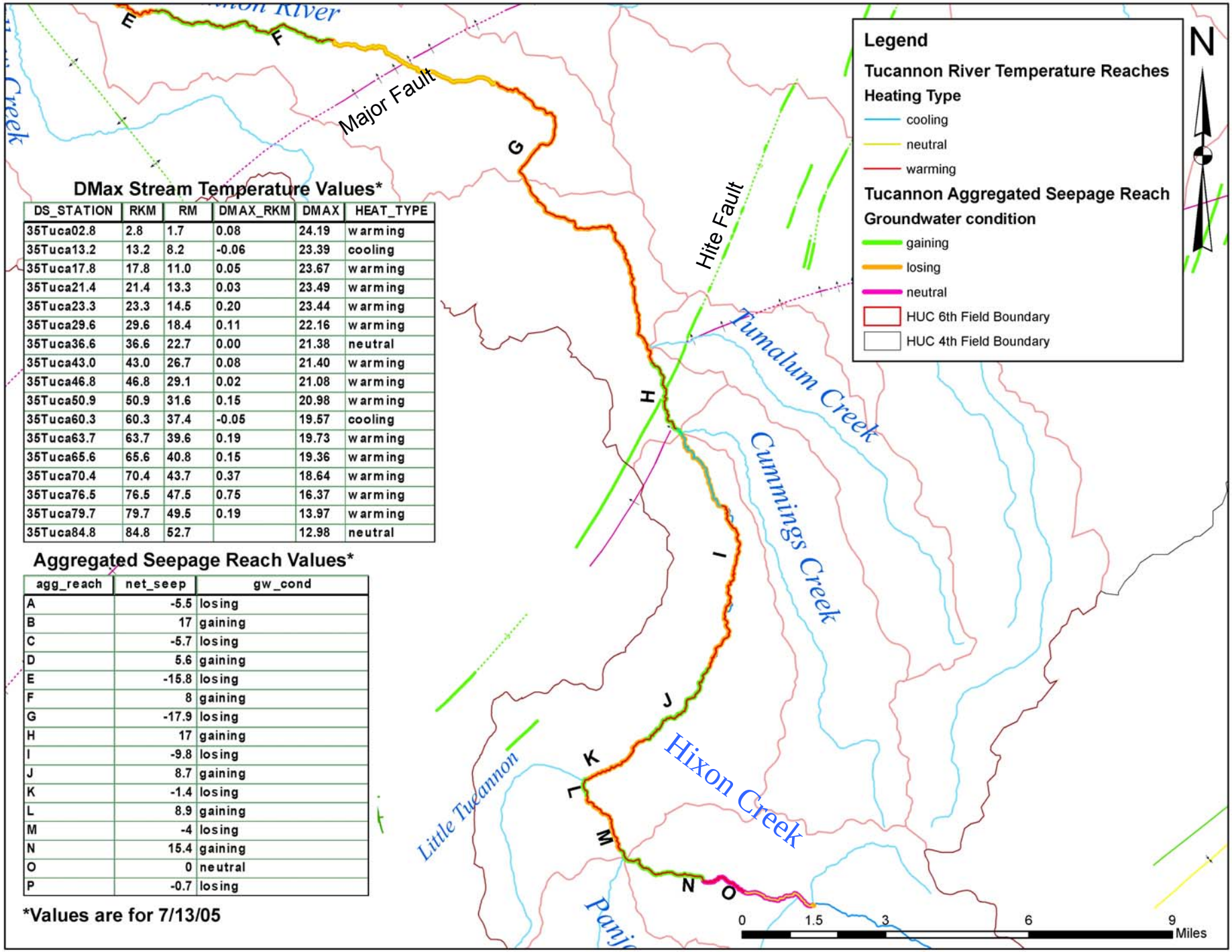
DMax Stream Temperature Values*

DS_STATION	RKM	RM	DMAX_RKM	DMAX	HEAT_TYPE
35Tuca02.8	2.8	1.7	0.08	24.19	warming
35Tuca13.2	13.2	8.2	-0.06	23.39	cooling
35Tuca17.8	17.8	11.0	0.05	23.67	warming
35Tuca21.4	21.4	13.3	0.03	23.49	warming
35Tuca23.3	23.3	14.5	0.20	23.44	warming
35Tuca29.6	29.6	18.4	0.11	22.16	warming
35Tuca36.6	36.6	22.7	0.00	21.38	neutral
35Tuca43.0	43.0	26.7	0.08	21.40	warming
35Tuca46.8	46.8	29.1	0.02	21.08	warming
35Tuca50.9	50.9	31.6	0.15	20.98	warming
35Tuca60.3	60.3	37.4	-0.05	19.57	cooling
35Tuca63.7	63.7	39.6	0.19	19.73	warming
35Tuca65.6	65.6	40.8	0.15	19.36	warming
35Tuca70.4	70.4	43.7	0.37	18.64	warming
35Tuca76.5	76.5	47.5	0.75	16.37	warming
35Tuca79.7	79.7	49.5	0.19	13.97	warming
35Tuca84.8	84.8	52.7		12.98	neutral

Aggregated Seepage Reach Values*

agg_reach	net_seep	gw_cond
A	-5.5	losing
B	17	gaining
C	-5.7	losing
D	5.6	gaining
E	-15.8	losing
F	8	gaining
G	-17.9	losing
I	-9.8	losing
J	8.7	gaining
M	-4	losing
O	0	neutral
H	17	gaining
K	-1.4	losing
L	8.9	gaining
N	15.4	gaining
P	-0.7	losing

*Values are for 7/13/05



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35Tuca36.6	36.6	22.7	0.00	21.38	neutral
35Tuca43.0	43.0	26.7	0.08	21.40	warming
35Tuca46.8	46.8	29.1	0.02	21.08	warming
35Tuca50.9	50.9	31.6	0.15	20.98	warming
35Tuca60.3	60.3	37.4	-0.05	19.57	cooling
35Tuca63.7	63.7	39.6	0.19	19.73	warming
35Tuca65.6	65.6	40.8	0.15	19.36	warming
35Tuca70.4	70.4	43.7	0.37	18.64	warming
35Tuca76.5	76.5	47.5	0.75	16.37	warming
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G	-17.9	losing
H	17	gaining
I	-9.8	losing
J	8.7	gaining
K	-1.4	losing
L	8.9	gaining
M	-4	losing
N	15.4	gaining
O	0	neutral
P	-0.7	losing

*Values are for 7/13/05

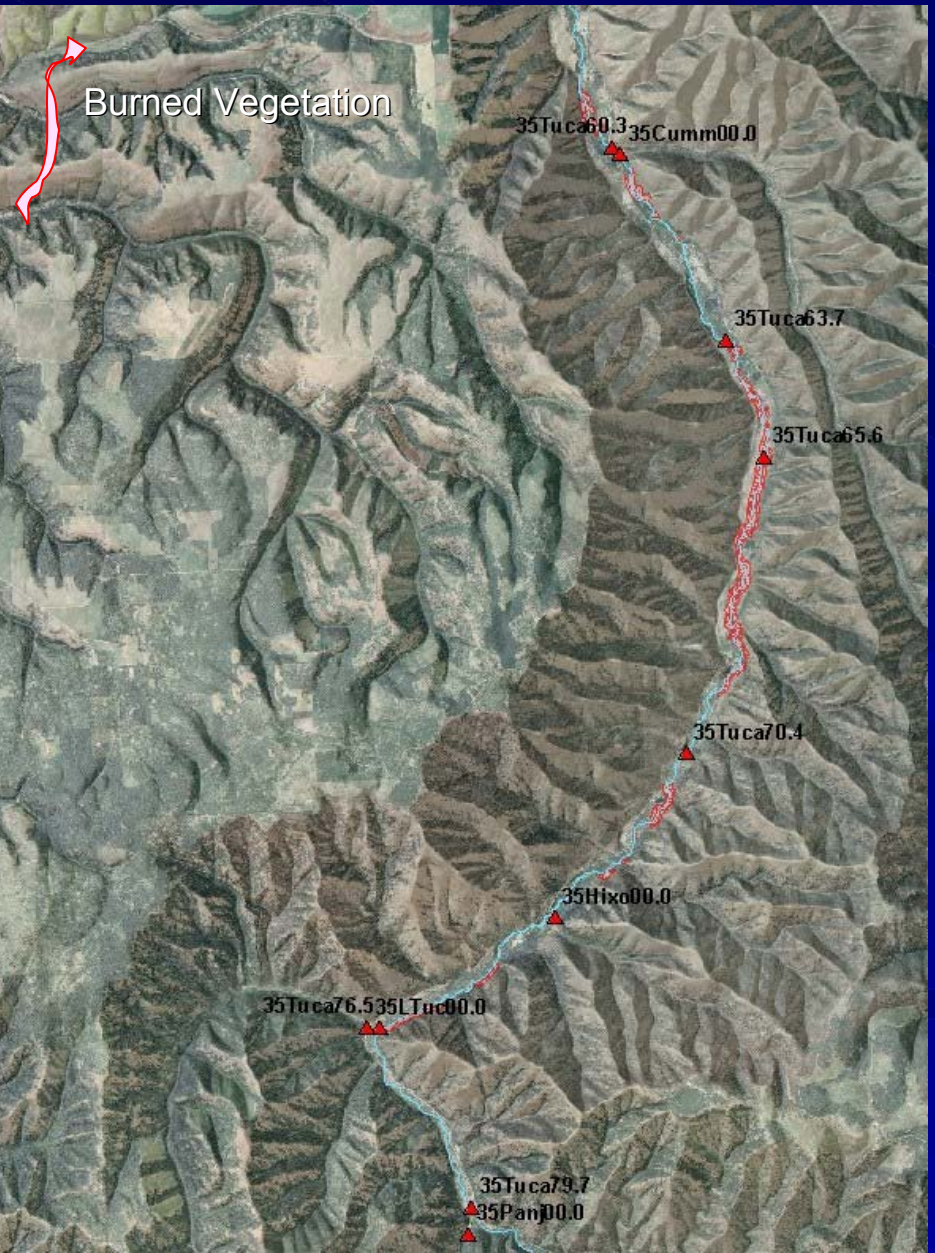
Riparian Vegetation Analysis

- Checked vegetation coding in HDR's analysis against better aerial imagery.
- Pataha Creek vegetation analysis is in process

Delineated Riparian Vegetation

Tucannon River Burned Riparian Areas

Schoolhouse Fire 8/5/05 - 8/13/05



ΔDMax Stream Temperature on 7/13/05

Next Steps for Vegetation Analysis

- Define and Validate values used for system potential vegetation
- Rerun SHADE for current vegetation
- Define Load Allocations for effective shade

Next Steps for TMDL Submittal