East Fork Lewis River Thermal Study Meeting #3: Preferred Sites for Concept Development

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Lower Columbia Estuary Partnership

Project Goals Review

1. Mainstem, tributary and off-channel water temperature assessment for lower East Fork Lewis River (LEF). Includes identification & mapping of existing thermal refuge locations.

2. Identify areas to protect and restore - thermal refuges along the LEF and primary tributaries.

- List of potential sites
- Concept designs for top 3 sites

3. Revise habitat project recommendations in the LEF HRP as needed to incorporate these and other thermal actions.

- Temp. listed as primary limiting factor Fall Chinook (SalonPORT)- all life histories
- Also for coho and summer steelhead

Project Timeline

Year 1

▪ Thermal-IR temperature data acquisition	summer ‘20
▪ Thermal-IR field verification and habitat assessment of existing cold locations.	summer ‘21
▪ Compile existing temperature info.	fall ‘21
▪ Technical Oversight Group Meeting 1 – present temperature/site assessment results, primary focus areas.	Oct. 27, ‘21

Year 2

▪ Identify strategies to protect, enhance and create thermal refuge opportunities.	Nov–Dec ‘21
▪ Develop initial site list.	Dec ‘21
▪ Develop site ranking methodology.	Jan ‘22
▪ Rank initial sites (restoration opportunities)	Jan ‘22
▪ Create map with temperature results, supporting data, sites.	Jan ’22
▪ Technical Oversight Group Meeting 2 – review site selection and ranking methodologies, initial site list, ranked sites.	Jan 27, ‘22
▪ Refine ranking methods and site list	Feb- April ‘22
▪ Technical Oversight Group Meeting 3- Review Final Ranking- Select Sites for Concept Development	Late April ’22
▪ Develop conceptual alternatives for top sites.	May ’22
▪ Technical Oversight Group- via email review restoration alternatives & provide comments.	Late May ’22
▪ Finalize concept designs for top three sites.	June ’22
▪ Develop recommendations for landscape level strategies[1] and changes to LEF_HRP.	June ‘22
▪ Technical Oversight Group Meeting 4 – review of final concept designs, additional recommendations.	June ’22
▪ Deliver final products (report, data, concept designs).	June ’22

1. Includes broad-based prioritization of areas for improved riparian shading.

TOG Meeting 1 & 2 Re-cap

Meeting 1:

1) Reviewed data: thermal-IR and in-stream results.
2) Prioritized focal areas to protect, restore, and create CRW.
   1. Above La Center 2. Below Lewisville 3. Ridgefield Pits
   4. Lucia Falls

Meeting 2:

1) Reviewed Thermal Restoration Strategies at different scales

2) Got feedback on site ranking criteria and prioritization

3) Discussed specific sites

4) Discussed data gaps on tributaries and private prop. challenges

5) Reviewed literature resources and techniques for thermal restoration

Technical Resources – Project Concepts

From Kurylyk et al. 2015, Ecohydrology

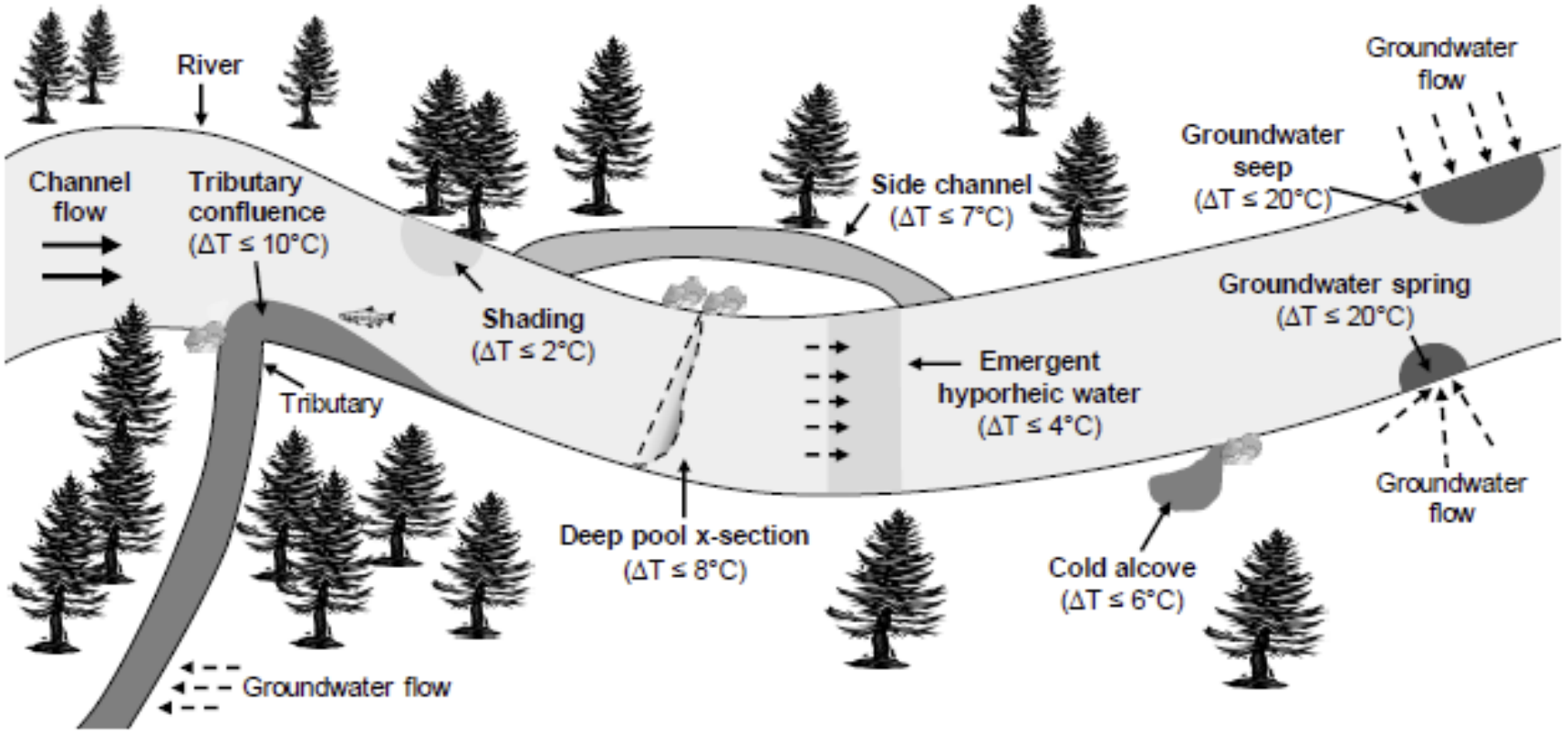
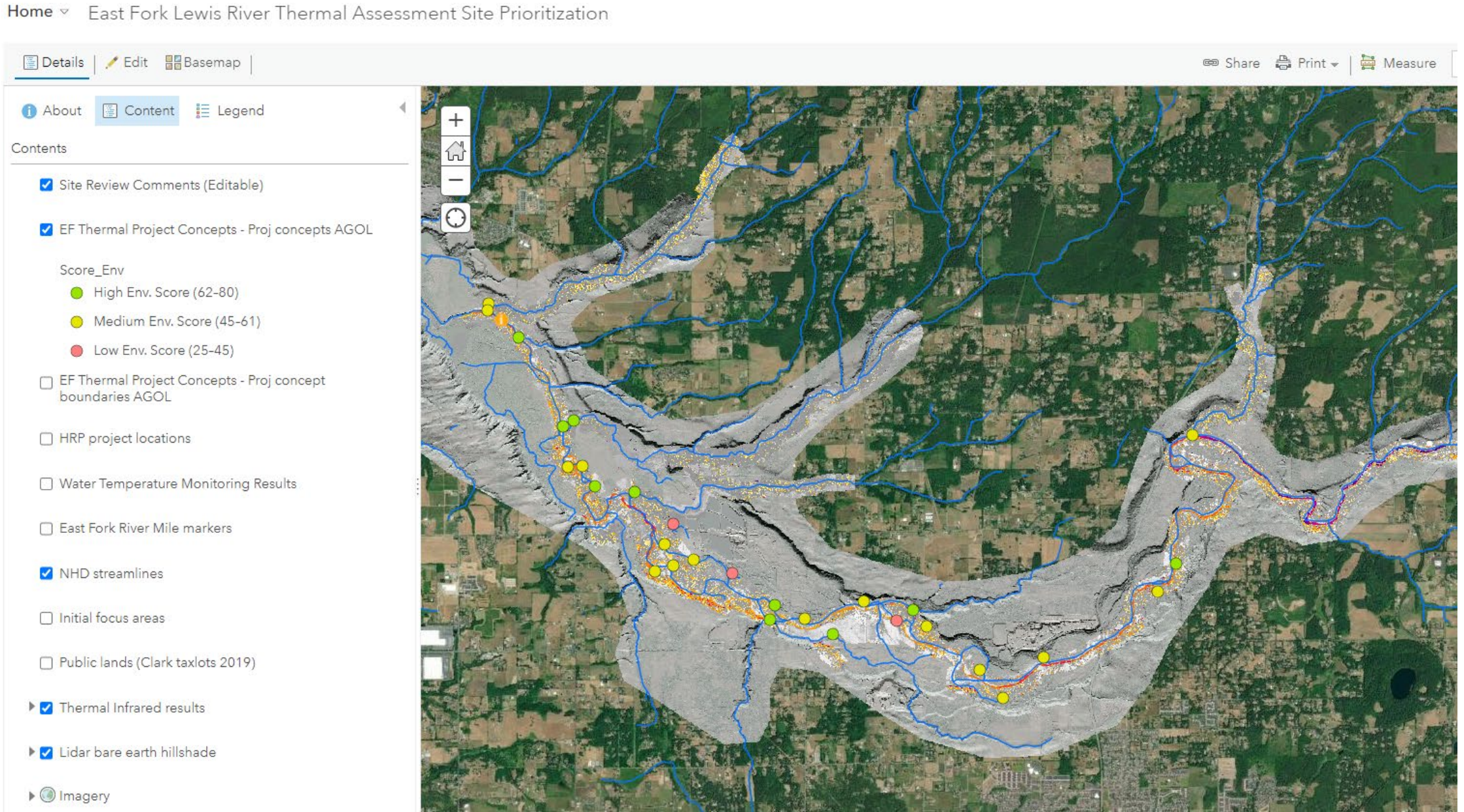


Figure 1. A conceptual overview of mechanisms that induce thermal diversity in rivers and create suitable thermal refugia. The estimated maximum temperature differences between a particular thermal anomaly and the ambient river temperature given in brackets are derived from other literature sources (Ebersole *et al.*, 2003b; Nielsen *et al.*, 1994) and extensive aerial infrared images and in-stream thermal surveys of the Little Southwest Miramichi River and other branches of the Miramichi River (*e.g.*, Wilbur, 2012). Darker colors indicate colder water.

ArcOnline EFLR Thermal Map



Revised- Site Scoring Criteria

Environmental

Criteria	Factors Considered	Weight (0–1)
Cooling source	Quality/reliability of cooling source	1
*Size	CWR size potential	1
*Treatment strategy	Enhance or create new	1
Connectivity	Does the site fill a CWR gap?	.5
Mainstem proximity	Ease of access for rearing fish	.5
Surrounding habitat quality	Indicator of potential fish use	.4
Ecology gaining reach?	Indicator of good groundwater potential	.4
LEF HRP priority	Indicator of site habitat potential	.4
*Consistent w/ processes	How does action match physical processes?	.7
*Riparian uplift	Potential for increased shading benefits	.3

Social

Criteria	Weight (0–1)
Ownership	1
Access	1
Likelihood of inclusion in another project	.5
*Partner Support	.5

*New or edited criteria

Top Ten Site List

Rank	Site ID	Site Name/ Location	Short Description	Approx RM	Feature Type	Existing HRP concept?	Develop Thermal Concept?	LCEP Avg. Env. Scores	LCEP avg. Social Score

Prioritization Process

- Scored 30 individual sites
- Normalized and averaged scores
- Ranked according to Environmental Score
- Evaluated with Social Score and Grouped

Categories of Top Sites

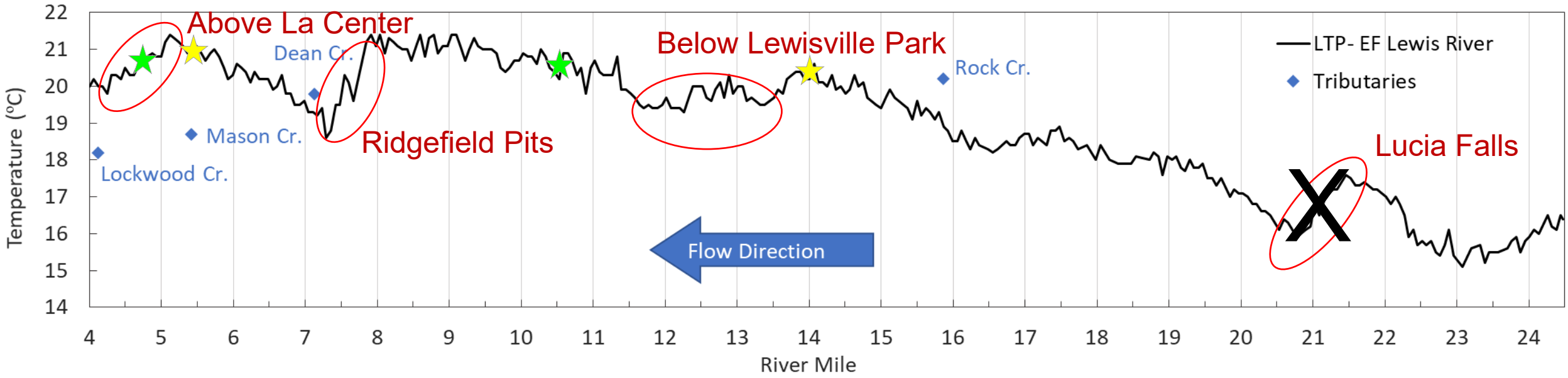
- Selected for Concept Development
- Consider Concept Development
- Honorable Mention
- Not selected

Top Ten Site List

Rank	Site ID	Site Name/ Location	Short Description	Approx RM	Feature Type	Existing HRP concept?	Develop Thermal Concept?	LCEP Avg. Env. Scores	LCEP avg. Social Score
Top Ten Ranking Sites- based on LCEP Avg. Environmental Scores									
1	15	Side-channel above Daybreak Bridge (R bank)	Historic mainstem now complex off-channel habitat with trib input (Graham Cr?), beaver dams, deep pools. Actions could include protect, improve fish access, add LWD/complexity.	10.5	side-chan		Yes	79	67
2	12	Mill/Manley confluence	Beaver ponds at Manley confluence. Actions could include more complexity or possible re-grade to increase access but would need more eval. (EF27 in HRP)	9.4	off-chan			79	50
3	23	Mason Cr floodplain	Disturbed Trib floodplain habitat along lower river. Included in the Mason Creek project design. Actions to include: bank planting, large wood, possible grading/ bank peelback. (MS01 in HRP)	0.2	Trib	Y		71	75
4	1	East Fork, RM 4_5-5_5	Lower mainstem reach with limited habitat. Actions could include: rearing habitat enhancement, complexity, LWD. TIR showed relatively cool reach. (near BPA 43B project area)	4.5-5.5	mainstem		Yes	71	96
5	29	Manley Creek Floodplain	Manley Cr. Habitat enhancement on lower floodplain trib habitat- actions could inlcude planting, bank peelback, LWD. (MN02 in HRP)	0.5	Trib	Y		68	38
6	10	County Yard Side channel RM 9 - 9.5 (R bank)	Side channel habitat (year round) that was confirmed cold in July 21. Actions could include habitat enhancemnt, increased connection and riparian planting in sections. Likey to be included in the Pits project. Likey to be included in the Pits project. (EF 28 in HRP)	9-9.5	side-chan	Y		67	71
7	21	Lewisville Private Off-channel RM 14.1 L bank	Small off channel area with a small trib/seep. HRP observed cold water here and identifed a thermal project concept. Actions could include: grading and wood. (EF05 in HRP)	14.1	off-chan	Y	Maybe? w/ # 20	64	25
8	24	Dean Creek floodplain	Opportunities on Dean Cr throughout floodplain, as per HRP (DE01)	0.2	Trib			62	54
9	25	Mason Cr/EF confluence	Mason Creek confluence - Actions include potential deflector structure to pool cool water at mouth, add complexity and habitat	5.9	confluence		Maybe?	62	42
10	4	Chum Channel' Off-channel RM 6.6 R bank	Cold off channel area previously restored for chum channel. Currently has silted in and Actions could include reconnect as flow through but it might fill in again. (EF38 in HRP)	6.6	off-chan			62	38

Potential Project Sites

Temperature Profile

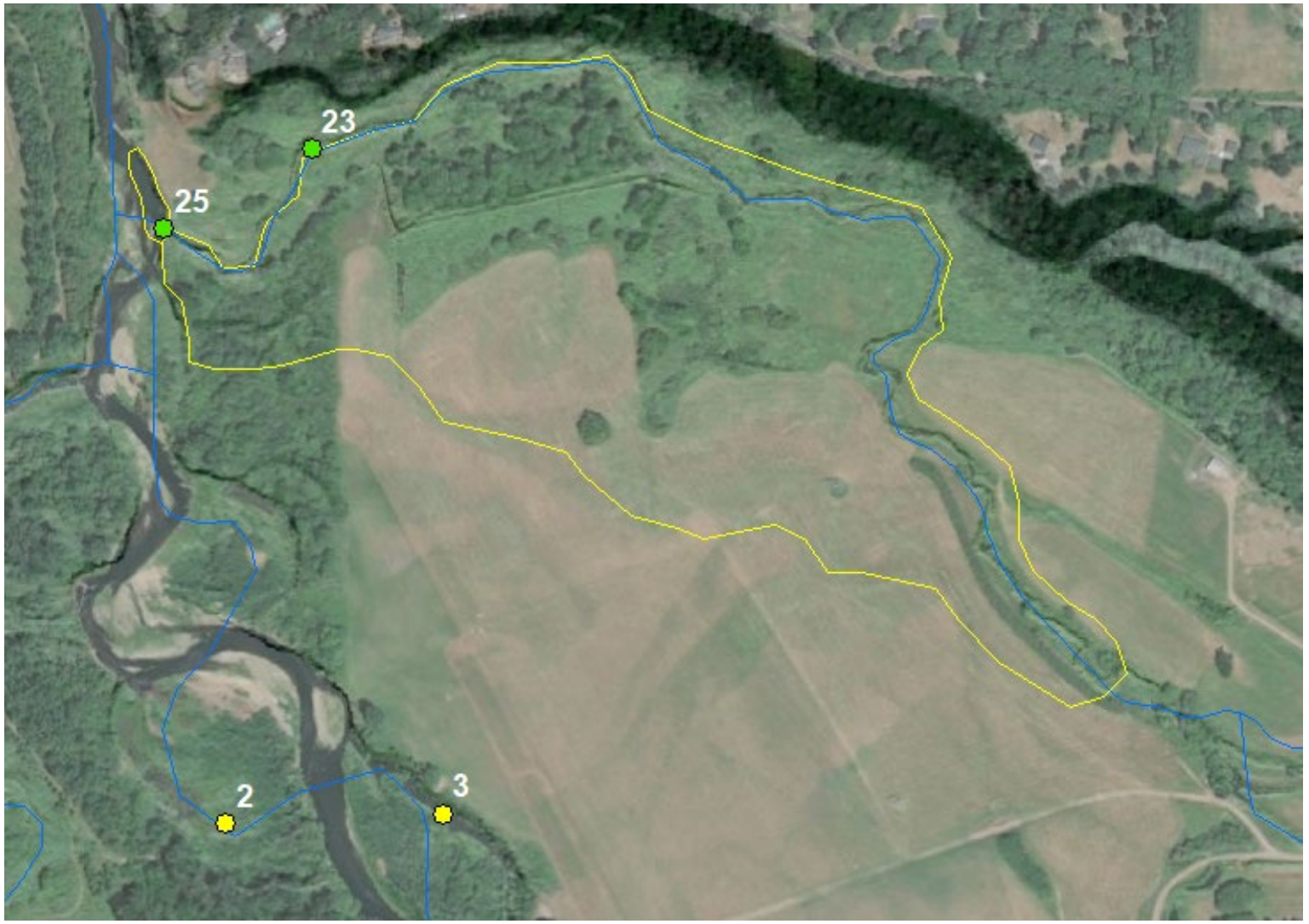


Top Sites- Not Selected

12. Mill/Manley Confluence
29. Manley Creek Floodplain
10. County Yard Side Channel

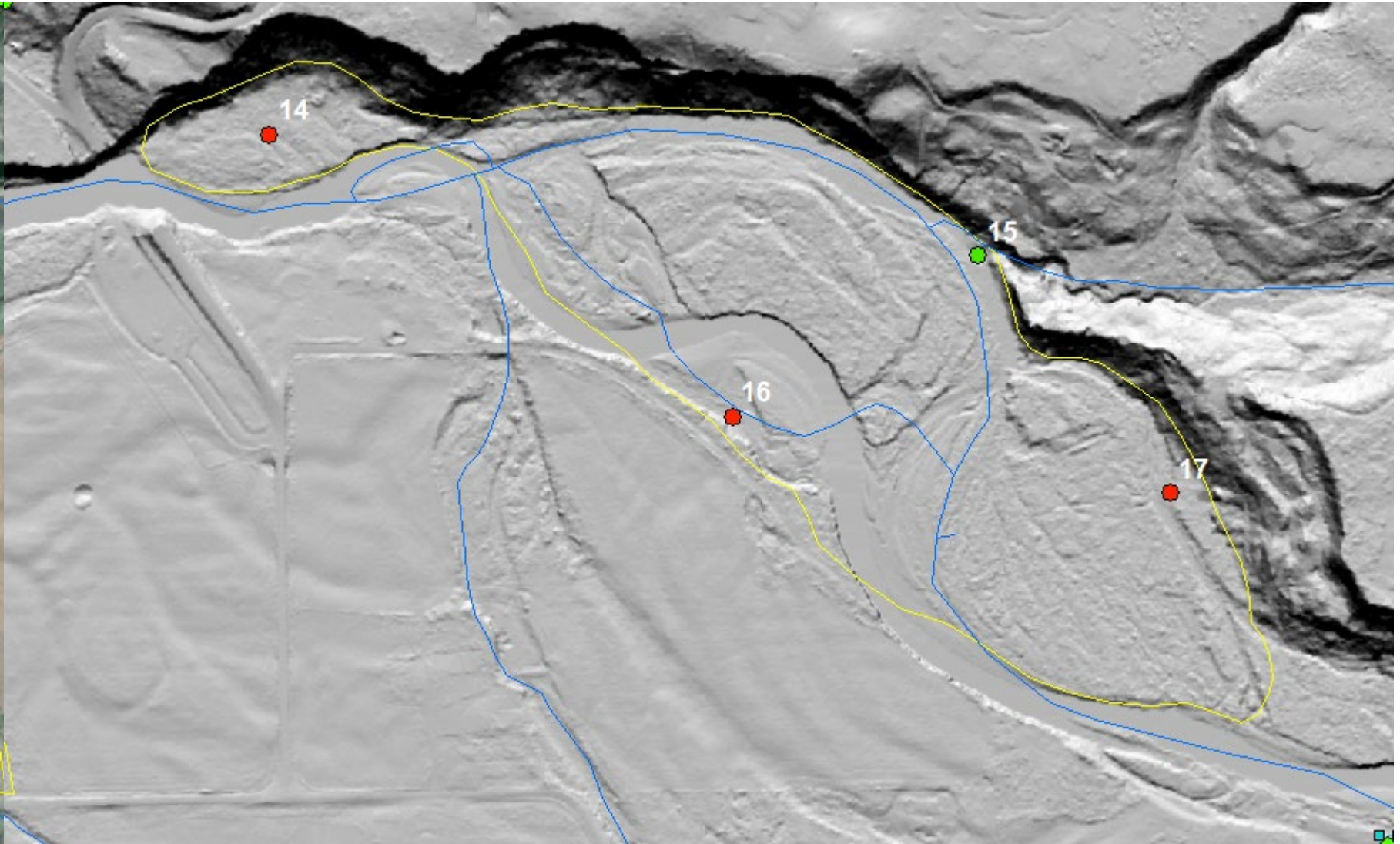
Top Sites- Not Selected

23. Mason Creek Floodplain



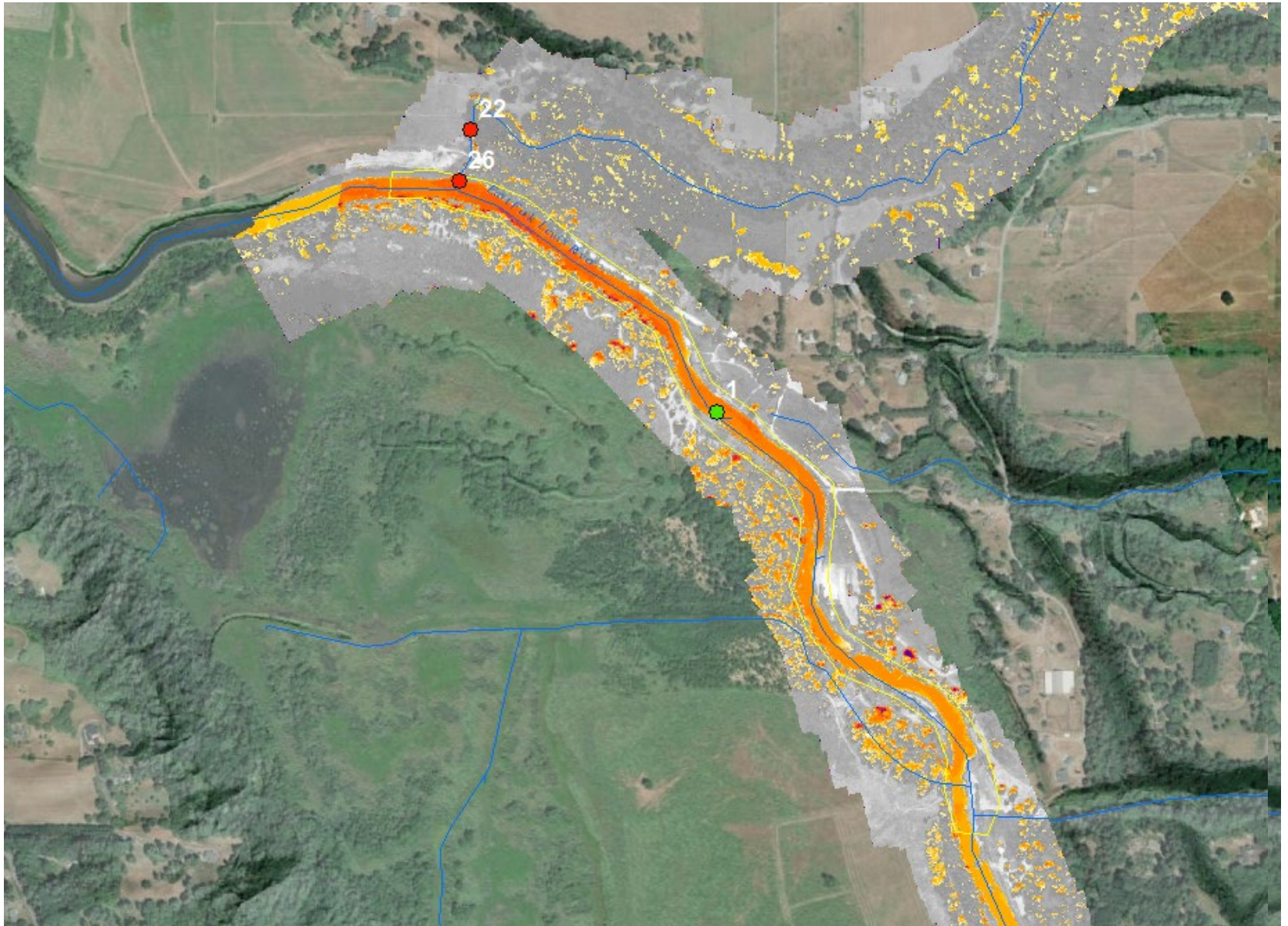
Top Sites- Recommended for Concept Development

15. Side-channel above Daybreak



Top Sites- Recommended for Concept Development

1. East Fork RM 4.5-5.5



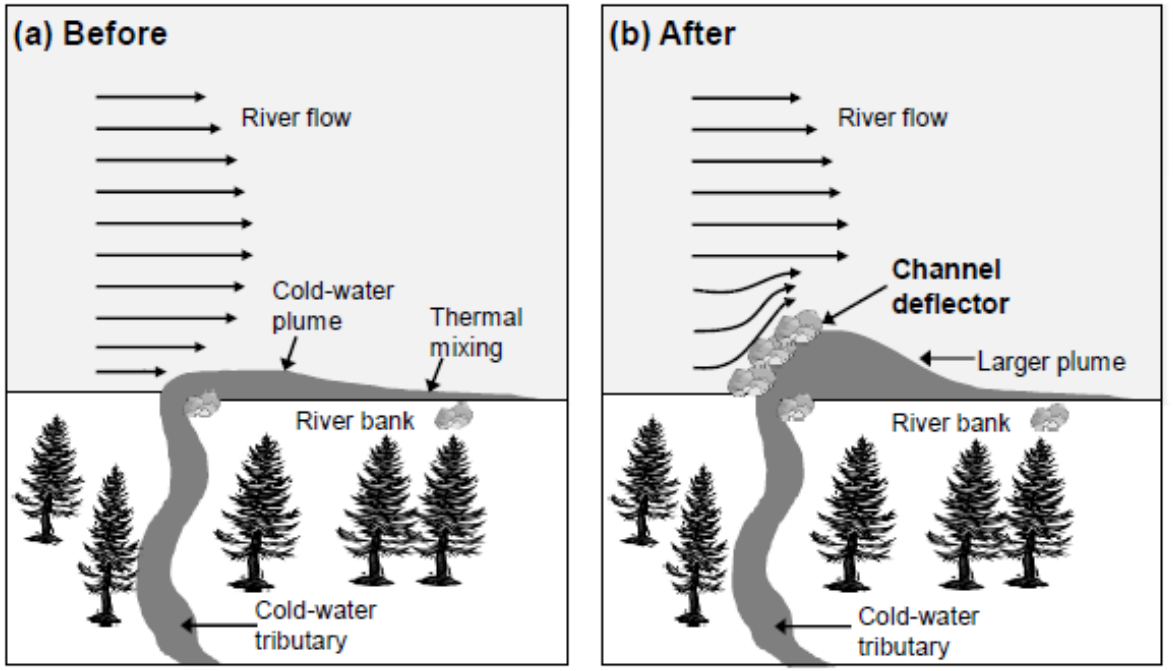
Top Sites- Consider Concept Development

21. Lewisville private off-channel

20. Lewisville public side-channel

Top Sites- Consider Concept Development

25. Mason Cr & East Fork Confluence



Cold-water plume at mouth of tributary before (a) and after (b) install of channel deflector. Taken from Kurylyk (2014).

Honorable Mention Site List

Rank	Site ID	Site Name/ Location	Short Description	Approx RM	Feature Type	Existing HRP concept?	Develop Thermal Concept?	LCEP Avg. Env. Scores	LCEP avg. Social Score
Honorable Mention Sites									
13	**20**	**Lewisville Public Side-channel RM 13.7 L bank**	Med. side- channel area with good riparian. We did not observe cold water here. Potential Action: a hyporheic zone exansion by limiting upstream flow entering, or some other way? (EF07 in HRP) lists this area as relatively high priority but does not identify temperature potential	13.7	off-chan		**Maybe w/ # 21?**	**59**	**75**
19	**2**	**Off-channel RM 6.3 L Bank (above 5A side chan project)**	off channel enhancement - need to determine thermal potential.	6.3	off-chan			**53**	**88**
20	**3**	**Swanson Off-channel RM 6.4 R bank**	Off channel area that has sedimented in over time. Not indicating cold on the TIR. (EF39 in HRP)	6.4	off-chan			**52**	**38**
	30	**Mason Floodplain Trib/Ponds**	Off channel ponded area S of NE 290th St- Mason Trib. Cold water observed. Actions: improved connection & habitat enhancement	1.5	Trib				

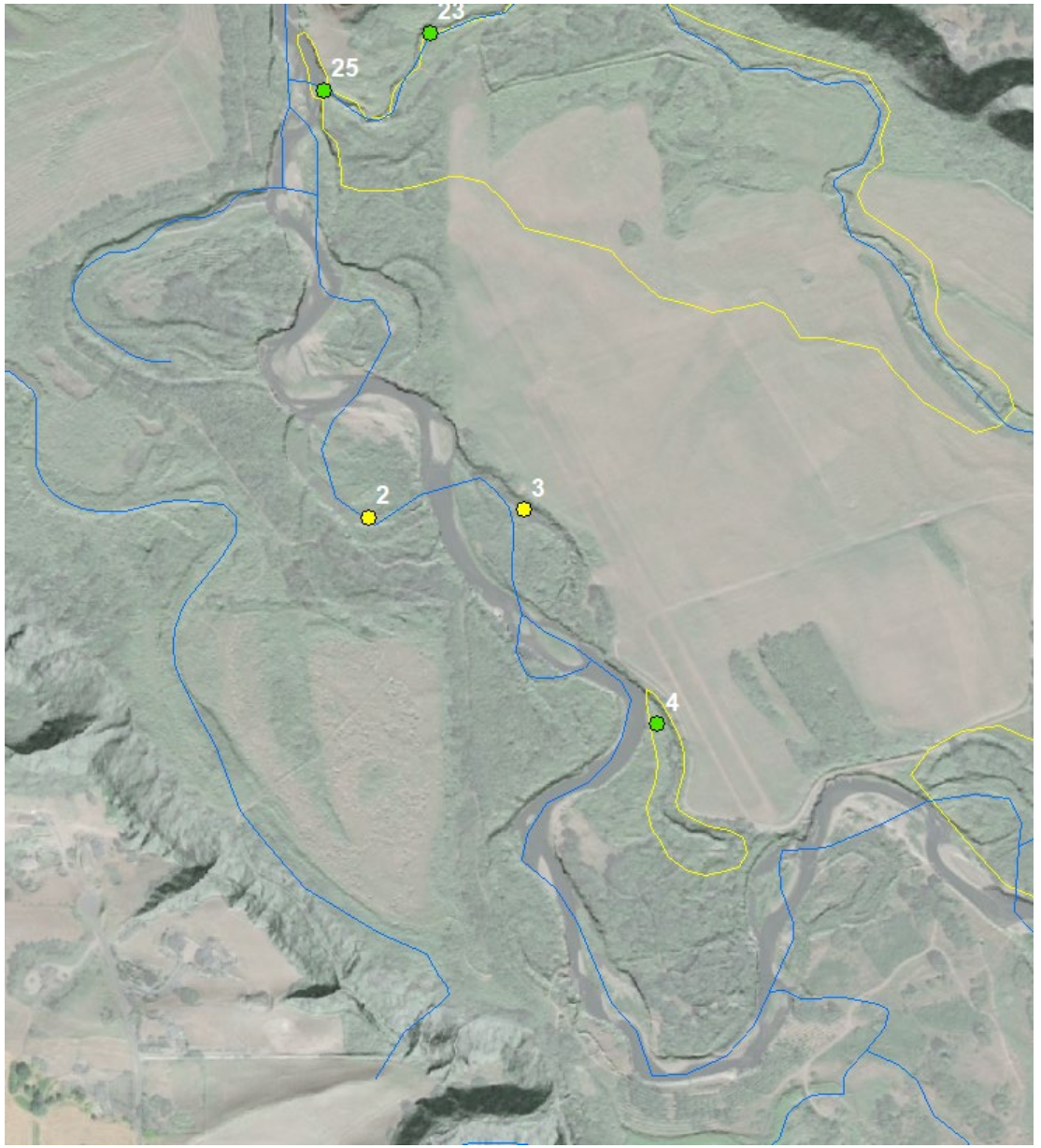
Honorable Mention- Consider Next Steps

24. Dean Creek Floodplain

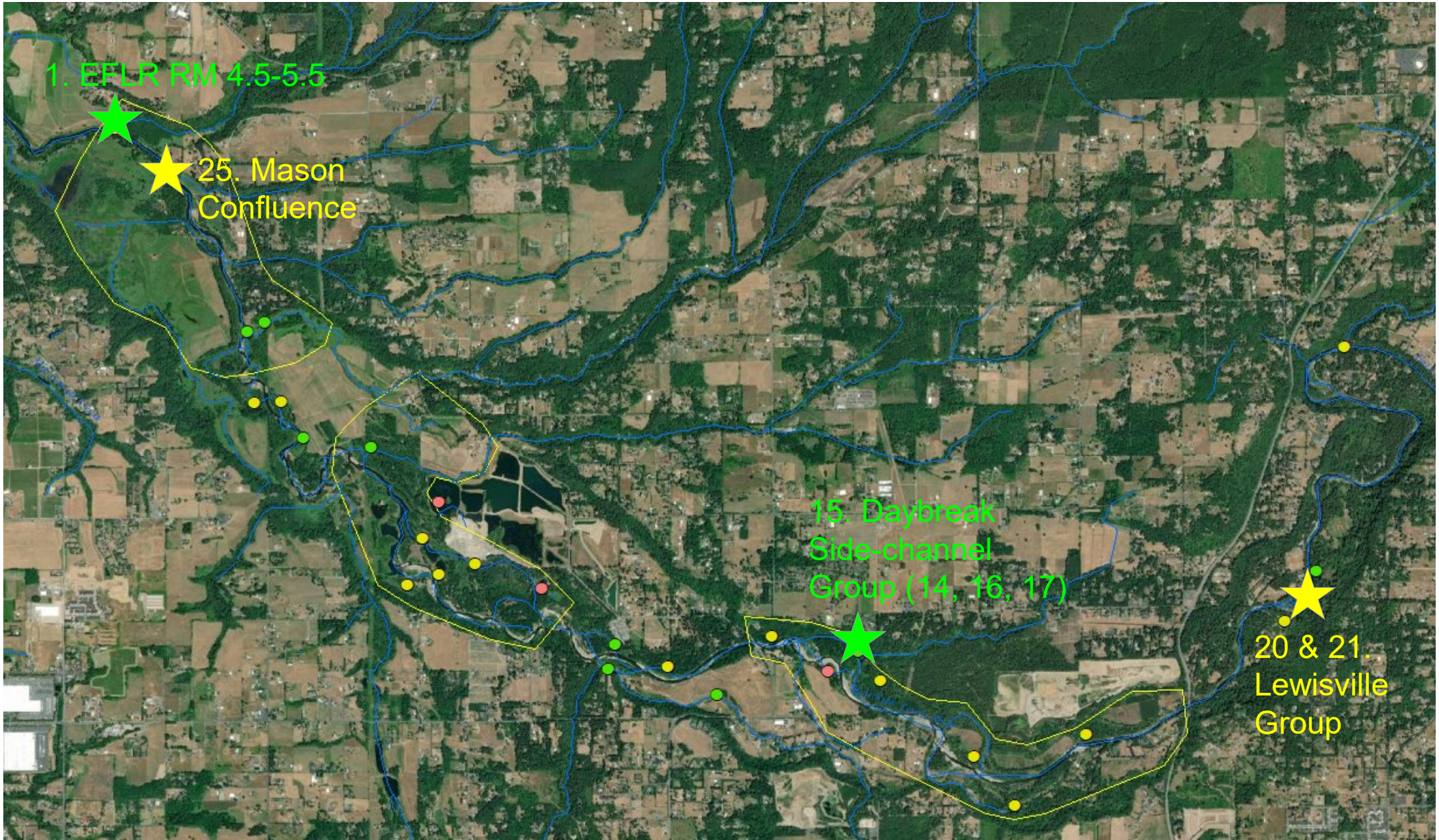
30. Mason Floodplain Trib/Ponds

Honorable Mention- Consider Next Steps

2. Off-channel RM 6.3 Lbank
3. Swanson off-channel RM 6.4
4. Chum Channel off-channel RM 6.6



Potential Concept Selections



Final Site Selection

Which 3 Sites/Group? Develop Concept Plans

- Site #15. Side-channel above Daybreak
  - With Sites 14, 16, 17, if applicable
- Site #1. East Fork Mainstem RM 4.5-5.5
- Site #20. & 21. Lewisville off-channel areas
- Site #25. Mason Confluence
- Others?

Next Steps

- LCEP to generate alternatives for top three sites.
- Technical Oversight Group- review project alternatives- May
- LCEP Draft Concept Designs- June
- Technical Oversight Group- Review concepts and give Comments- June
- Upcoming Meetings:
  May: Review alternatives for three priority sites (or via Email).
  June: Review concept designs for restoration alternatives.

Thank you!

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- Extra Slides

HRP Concepts for Sites 16 (EF21) & 17 (EF20)

HRP Concepts for Sites 16 (EF21) & 17 (EF20)

Lower East Fork Lewis River Habitat Restoration Plan April 2009