

#### Dry Creek Habitat Enhancement EFFECTIVENESS MONITORING AND EVALUATION

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#### Dry Creek Habitat Enhancement Project Summary

- 2010
- 2012
- 2013
- 2014
- 2016
- 2017
- 2018





#### Annual and cumulative area (ft<sup>2</sup>) of habitat enhnanced in Dry Creek



# How do we evaluate habitat?

- Dry Creek Adaptive Management Plan
  - Primary metrics
    - Depth: 0.5 2.0 ft; 2.0 4 ft
    - Velocity: <0.5 ft/s
    - Habitat shelter value
  - Habitat checklist
    - **Features**
    - Sites
    - Reaches
- Geomorphic change
- Aerial photographs









# Optimal depth and velocity

**Truett Hurst Enhancement Reach** 









Mars Date: 4/2/2010

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rvey Date: November 2016 ev Type: Post-Construction

er 14.01)



# Optimal depth and velocity

**Truett Hurst Enh** 



**Truett Hurst Enhancement Reach** 















Optimal hydraulic habitat 0.5 - 2.0 ft; < 0.5 ft/s 2.0 - 4.0 ft < 0.5 ft/s





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## Main channel

### Side channel

**Truett Hurst Enhancement Reach** 



#### **Truett Hurst Enhancement Reach**



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th Length: 950 ft (290 m)

vev Date: June 2016

vev Type: Pre-Construction

#### Habitat data

**Truett Hurst Enhancement Reach** 





ch Name: Truett Hurst Reach Name: Trust Hurst Project Reach: 2 Enhancement Reach: 8 Inter-Fluxe Reach: 8b er Mile: 8.71 (River Kilometer 14.01) Reach Length: 950 ft (290 m) Survey Date: November 2016 Survey Type: Post-Construction

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41-60 61-80 81 - 120 121 - 240 241 - 300

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Map Date: 4/2/2019



#### Shelter value

**Truett Hurst Enh** 



#### **Truett Hurst Enhancement Reach**







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## Main channel

### Side channel

**Truett Hurst Enhancement Reach** 



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**Truett Hurst Enhancement Reach** 



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#### 2018 Summer Density of Steelhead in Side Channels





# **Beyond primary metrics**

**City of Healdsburg Yard Enhancement Reach** 





City of Healdsburg Yard ement Reach: 0ach: 2b (see left panel la: 1 B3 (Diver Kil : 1.83 (River Kilometer 2.94) Length: 1.160 ft (354 m) September 201 Type: Post-Con

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Man Date: 4/3/20

## Each reach divided into sites

**City of Healdsburg Yard Enhancement Reach** 









Reach Name: City of Healdsburg Yard Project Reach: 03 Enhancement Reach: 04 Inter-Flave Reach: 2b (see left panel) River Mile: 1.83 (River Kilometer 2.94) Reach Length. 1,100 ft (354 m) Survey Date: September 2017 Survey Tope: Post-Construction

Map Date 4/2/2019 DISCLAMER: This map document and associated data are distributed for informational purposes only 76-515" at the published scala and provided without warrately of any lond, expressed or implied. The positional accuracy of the data is approximate and not interfed to represent survey may accuracy. The Social Cost Vitance Angony same are not responsibly available for the used of the information.

### Each site contains features

**City of Healdsburg Yard Enhancement Reach** 





Reach Name: City of Healdsburg Yard Project Reach: 03 Enhancement Reach: 04 Inter-Flave Reach: 26 (see left panel) Reach Length: 1,160 ft (354 m) Survey Date: September 2017 Survey Type: Rost-Construction

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Site 4 ---- Features, Site 4

Site 5 ---- Features, Site 5

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Mars Date: 4/3/2019

#### Dry Creek Adaptive Monitoring Plan

FFCHANNEL HABITAT ENHANCEMENT		EFFECTIVENESS (post- treatment)		
EFFECTIVENESS MONITORING				
	Feature Type Code			
Feature	1. Length of targeted treatment: (ft)			-
	2. Width of targeted treatment: (ft)			_
	Area of offchannel habitat improved: ft <sup>-</sup> Structural conditions Eucl. Cond. Entry, Door, Ently			
	<ol> <li>Subdulai condition: Exci, Good, Fuir, Foor, Fuir</li> <li>Ana machines with the feature visible? Turnes: ANC. DDD. CDE. MAT. SHE. STD. SHA.</li> </ol>			-
	UND. UNS. WSH. OTH			
	6. Is the feature still in its original location, position & orientation?			
Depth/Habitat	7. Current level II habitat type: FLT, POO, RIF, DRY, ALC, OTH			
	8. If an objective, did the feature create the targeted instream habitat type?			
	9. Were there any unintended effects on the habitat type? If Y, comment.			
	10. Maximum residual water depth in main channel area: ft			
	11. Maximum residual depth associated with the feature: ft			
	a. If an objective, did the feature increase/decrease water depth in the treatment area?			
	<ol> <li>Measure the targeted depth or range ft</li> </ol>			
	a. Estimate area of feature within targeted depth or range ft <sup>2</sup> :			
	13. Were there any unintended effects on the water depth? If Y, comment.			
Shelter	14. Instream shelter value in the treatment area: 0, 1, 2, 3			
	15. Percent of habitat unit covered by shelter: %			
	16. 1st/2nd dominant: BED, BOL, BUB, LWD, RTW, SWD, UCB, VEG, OTH	/	/	/
	17. If an objective, did the feature increase instream shelter rating?			-
	a. Calculate the shelter rating: U-300	/	,	/
	<ol> <li>Large woody debris count in treatment area: D &gt;1, L 0-20 / D &gt;1, L &gt;20</li> <li>If an objective, did the feature increase I WD count in the treatment area?</li> </ol>	/	/	/
	a. LWD recruitment methods: ANC. EXC. EXH. INT. RPR. UNA. OTH			
Channel	20. Current main channel problems: AGG, BRD, FLO, GRC, HDC, INC, NAR, SCU, STT,			
	WID, NON, OTH			
	21. Did the feature lead to the targeted off channel conditions?			
	a. Overall Offchannel Condition: AGG, FPD, GRC, INC, NAR, SIN, STB, TOG, WID, OTH			
	b. Outlet Conditions: AGG, FPD, GRC, INC, NAR, SIN, STB, TOG, WID, OTH			
	c. Inlet Conditions: AGG, FPD, GRC, INC, NAR, SIN, SIB, TOG, WID, OTH			
	22. Were there any unintended effects on the main channel? If Y, comment.			
	23. If an objective, did the feature decrease/increase velocity in the treatment area?			
Velocity	a. Targetea vetocity/range: J/sec			
	c Measure the velocity/range ff/sec:			
	d. Area of habitat unit within targeted velocity: $t^2$			
	24. Percent of habitat unit within targeted velocity see above: %			
	25. Were there any unintended effects from velocity change? If Y, comment.			
Other	26. 1st/2nd dominant substrate: BED, BOL, COB, GRV, SND, SLC, OTH	/	/	/
	27. % Canopy Measurement:			
	28. Photopoint data collected: yes / no			
	29. Temperature Profile: yes / no			
	30. Dissolved Oxygen Profile: yes / no			
Rapie	31. % area where targeted depth, velocity and shelter criteria overlap:			
	32. Does this feature need: DEC, ENH, MNT, REP, NON, OTH			
	33. Are additional restoration treatments recommended at this location?			
	34. Feature Effectiveness Rating: Excl, Good, Fair, Poor, Fail			
	FINAL SITE LEVEL RATING (feature level rollup): Excellent, Good, Fair, Poor, Fail			

#### For each site:

- Habitat type created: pool, riffle, backwater, etc.
- Primary metrics: velocity, depth, shelter, pool:riffle ratio

#### For each feature:

Condition

#### Function

Feature rating

Site rating

# **AMP Checklist**





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#### 2017

**Truett Hurst Enh** 



#### November 2016 Topography elevation (ft) < 140 140 - 142 142 - 144 144 - 146 146 - 148 Sonoma 148 - 150 > 150 Water DISCLAMER This map document Map Date: 4/15/2019

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**Truett Hurst Enhancement Reach** 



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July 2017 DEM of difference (November 2016 to April 2017) elevation change (ft; +/- 0.5 ft = no change) >-3.0 -3.0 - - 2.0 -2.0 --0.5 0.5 - 2.0 Sonoma 2.0 - 4.0 4.0 - 6.0 Water

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Reach Name: Truett Hurst Project Reach: 2 Enhancement Reach: 4 Inter-Flure Reach: 8b Ster Mile: 37 (Rover Klometer 14.01) Reach Length: 950 ft (290 m) Survey Joster. July 2017 Survey Type: Post-Effective Flow

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Reach Name: Truett Hurst Project Reach. 2 Enhancement Reach: 4 Inter-Fluve Reach: 85 Sover Mile. 371 (Rever Klometer 14.01) Reach Length: 550 ft (250 m) Survey Date: July 2017 Survey Type: Post-Effective Flow

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**Truett Hurst Enhancement Reach** 





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**Truett Hurst Enhancement Reach** 





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**Truett Hurst Enhancement Reach** 









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