



## Matilija Dam Giant Reed Removal Project

Water Quality Monitoring Summary- August 2007 -June 2008

Water Quality Monitoring of the Matilija Dam Giant Reed Removal Project (Project) was performed by both the Ventura County Watershed Protection District (District) and the Ventura River Stream Team of the Santa Barbara Coast Keeper (Stream Team). Six established sampling sites along with random spot checks within the Project area were monitored. Sampling started August 2, 2007, and is still ongoing, totaling 72 samples as of July, 2008. All samples were analyzed at a California EPA accredited laboratory. for glyphosate and non-ionic surfactants. Glyphosate is the active ingredient of the herbicide used, and the surfactants, a soap-like substance, aid in the plants absorption of that ingredient. To date no glyphosate has been found in any of the samples. Field measurements are also taken for the following parameters: temperature, conductivity, pH, turbidity, dissolved oxygen (DO), stream flow.

The sample sites are described in the Matilija Dam Giant Reed Removal Water Quality Monitoring Plan (Plan<sup>1</sup>, see Figure 1 and page 8).

District staff routinely sampled for glyphosate and the surfactant on the Thursday prior to the Stream Team's volunteer effort on the first Saturday of each month (Table 1). The Stream Team collected samples from three of the six established sites and lab analysis included a test for glyphosate (Table 2). Glyphosate sample containers supplied to the District by the lab were shared with the Stream Team along with chain-of-custodies (COC) to ensure consistency. Surface water samples were not collected if surface flow was absent from the routine sampling site.

**Table 1. Summary of Routine Sampling by District**

<b>Routine Site Dates</b>	<b>Number of Samples</b>	<b>Glyphosate Detections</b>
August 2, 2007	5	0
September 6, 2007	4	0
October 4, 2007	4	0
November 1, 2007	4	0
December 5, 2007	5	0
January 3, 2008	5	0
April 3, 2008	6	0
May 1, 2008	6	0
June 5, 2008	5	N/A
Total through June 2008	44	0

<sup>1</sup> The Plan can be found on line at <http://www.matilijadam.org/reports.htm>.

R – Random samples collected from flowing or ponded water upstream and downstream of active work area(s); these samples were not collected from an established sample site.



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### Water Quality Monitoring Summary- August 2007 -June 2008

**Table 2. Summary of Routine Sampling by Stream Team**

<b>Routine Site Dates</b>	<b>Number of Samples</b>	<b>Glyphosate Detections</b>
August 4, 2007	2	0
September 8, 2007	2	0
October 6, 2007	2	0
November 3, 2007	2	0
December 1, 2007	2	0
January 5, 2008	2	0
April 5, 2008	2	0
Total through June 2008	14	0

In addition to routine sampling, the District staff collected 14 random samples when the contractor was working near surface water (Table 3). The contractor was not notified when or where water quality sampling would occur. Two examples of specific sampling events within this program occurred in January and May 2008, as follows: The January 7, 2008 sampling was conducted in several locations after a major storm event that registered 7.17 inches of rain at the Matilija Dam gauge with the intent to discover if glyphosate entered the stream through storm runoff. On May 29, the District collected water samples upon receiving reports from the District inspector the contractor failed to meet all application protocol standards that morning.

**Table 3. Summary of Random Sampling by District**

<b>Random Site Dates</b>	<b>Number of Samples</b>	<b>Glyphosate Detections</b>
October 11, 2007	2	0
October 30, 2007	1	0
December 10, 2007	3	0
January 7, 2008	3	0
May 15, 2008	3	0
May 29, 2008	1	0
June 19, 2008	1	N/A
Total through June 2008	14	0

Sampling and analysis will continue as needed throughout the Giant Reed Removal portion of the Matilija Ecosystem Restoration Project.



## **Matilija Dam Giant Reed Removal Project**

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All field measurements and samples collected by District staff and the Stream Team were handled in accordance with the sampling methodologies described in the Sampling Plan, Section 6.0, pages 9 – 14. Clean sample handling protocols, based on EPA Method 1669, were followed and were summarized in the Plan (see Standard Operating Procedures in Section 7.2, pages 18-22). All samples were kept on ice from the time of collection until delivery to the appropriate laboratory as described in the Plan (see Section 10.6, pages 32-33).

Laboratory results from all District and Stream Team samples have shown both glyphosate and non-ionic surfactant products have not been detected in the surface flow in Matilija Canyon or the main stem of the Ventura River, with the exception of May 29, 2008. On this date, the contractor work fell below project standards, resulting in the minor over-application of product during foliar application. This action was identified by the District inspector and quickly corrected by the contractor. The District water quality staff were called immediately to take samples adjacent to the work area. Laboratory data indicate 0.31 mg/L, or parts-per-million, of the non-ionic surfactant were detected in the sample. Glyphosate was not detected.

An attached Excel spreadsheet provides a detailed summary of field parameters and laboratory results by sample date. The Stream Team data can also be found on-line at <http://stream-team.org/Ventura/main.html>.

## Matilija Dam Giant Reed Removal Project Water Quality Monitoring Results

Site	Constituent	Units	WPD Monthly Sampling				
			8/2/2007	9/6/2007	10/4/2007	11/1/2007	12/5/2007
<b>MDGRR-1</b>	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
	Flow	cfs					
	Dissolved Oxygen	%					
	Dissolved Oxygen	mg/L					
	Temperature	°C	DRY	DRY	DRY	DRY	DRY
	Conductivity	uS/mS					
	Specific Conductivity	uS/mS					
	Salinity	ppt					
	pH						
	Turbidity	NTU					
<b>MDGRR-2</b>	Glyphosate	ug/L	ND	ND	ND	ND	ND
	Non-Ionic Surfactant	mg/L	ND	ND	ND	ND	ND
	Flow	cfs	1.4	1.1	0.81	0.68	0.76
	Dissolved Oxygen	%	83.8	75.4	71.0	70.0	102.1
	Dissolved Oxygen	mg/L	7.37	6.61	6.96	6.9	10.94
	Temperature	°C	22.5	21.8	17.4	15.5	12.0
	Conductivity	uS/mS	780	778	728	617	666
	Specific Conductivity	uS/mS	820	828	851	751	885
	Salinity	ppt	0.4	0.4	0.4	0.4	0.4
	pH		7.6	7.7	8	7.6	7.95
	Turbidity	NTU	data missing	0.6	0.6	0.71	0.7
<b>MDGRR-3</b>	Glyphosate	ug/L	ND	ND	ND	ND	ND
	Non-Ionic Surfactant	mg/L	ND	ND	ND	ND	ND
	Flow	cfs	<1.0	<1.0	0.38	0.25	0.65
	Dissolved Oxygen	%	40.3	17.0	62.0	46.9	70.6
	Dissolved Oxygen	mg/L	3.66	1.55	5.64	4.59	6.67
	Temperature	°C	20.4	18.7	19.1	16.1	17.8
	Conductivity	uS/mS	883	962	954	887	995
	Specific Conductivity	uS/mS	961	1093	1075	1069	1152
	Salinity	ppt	0.5	0.5	0.5	0.5	0.6
	pH		6.8	7.2	7.5	7.4	7.45
	Turbidity	NTU	0.4	0.5	<0.2	0.29	0.29
<b>MDGRR-4</b>	Glyphosate	ug/L	ND	ND	ND	ND	ND
	Non-Ionic Surfactant	mg/L	ND	ND	ND	ND	ND
	Flow	cfs	1.35	>1.0	1.40	1.39	2.21
	Dissolved Oxygen	%	142.8	112.4	128.6	139.2	138.0
	Dissolved Oxygen	mg/L	11.12	9.88	10.74	13.14	12.82
	Temperature	°C	28.2	21.5	22.9	18.0	18.7
	Conductivity	uS/mS	1062	1096	1127	997	979
	Specific Conductivity	uS/mS	1001	1164	1174	1151	1113
	Salinity	ppt	0.5	0.6	0.6	0.6	0.6
	pH		8.3	8.4	8.5	8.5	8.42
	Turbidity	NTU	0.6	0.3	0.5	0.64	0.71
<b>MDGRR-5</b>	Glyphosate	ug/L	ND	ND	ND	ND	ND
	Non-Ionic Surfactant	mg/L	ND	ND	ND	ND	ND
	Flow	cfs	1.15	<1.0	1	1.81	-
	Dissolved Oxygen	%	131.2	128.6	120.7	112.5	104.8
	Dissolved Oxygen	mg/L	10.86	11.43	10.93	11.81	10.70
	Temperature	°C	24.8	21.1	19.8	15.9	14.3
	Conductivity	uS/mS	764	790	768	713	691
	Specific Conductivity	uS/mS	767	856	852	861	868
	Salinity	ppt	0.4	0.4	0.4	0.4	0.4
	pH		8.3	8.10	8.10	8.10	8.06
	Turbidity	NTU	0.2	1.9	<0.2	0.23	0.17
<b>MDGRR-6</b>	Glyphosate	ug/L	ND				ND
	Non-Ionic Surfactant	mg/L	ND				ND
	Flow	cfs	<1.0				0.30
	Dissolved Oxygen	%	169.6				111.8
	Dissolved Oxygen	mg/L	12.69				10.36
	Temperature	°C	28.5	DRY	DRY	DRY	18.9
	Conductivity	uS/mS	769				754
	Specific Conductivity	uS/mS	721				854
	Salinity	ppt	0.4				0.4
	pH		8.6				8.14
	Turbidity	NTU	0.3				0.20

ND = Non-Detect  
est. - Estimated Flow

**Matilija Dam Giant Reed Removal Project  
Water Quality Monitoring Results**

Site	Constituent	Units	WPD Monthly Sampling				
			1/3/2008	4/3/2008	5/1/2008	6/5/2008	7/10/2008
MDGRR-1	Glyphosate	ug/L		ND	ND		
	Non-Ionic Surfactant	mg/L		ND	ND		
	Flow	cfs		21.37	2.84		
	Dissolved Oxygen	%		90.0	96.1		
	Dissolved Oxygen	mg/L		9.14	9.76		
	Temperature	°C	DRY	14.7	14.6	DRY	DRY
	Conductivity	uS/mS		636	629		
	Specific Conductivity	uS/mS		792	786		
	Salinity	ppt		0.4	0.4		
	pH			7.97	7.33		
Turbidity	NTU		0.33	0.21			
MDGRR-2	Glyphosate	ug/L	ND	ND	ND		
	Non-Ionic Surfactant	mg/L	ND	ND	ND		
	Flow	cfs	1.0 est.	41.02	17.67	13.47	5.02
	Dissolved Oxygen	%	98.3	87.4	88.9	96.7	98.4
	Dissolved Oxygen	mg/L	11.06	8.88	8.67	8.84	8.41
	Temperature	°C	8.9	14.6	16.7	19.6	23.1
	Conductivity	uS/mS	682	638	481	782	787
	Specific Conductivity	uS/mS	984	796	572	872	818
	Salinity	ppt	0.5	0.4	0.3	0.4	0.4
	pH		8.14	8.15	8.12	8.03	7.96
Turbidity	NTU	1.7	0.42	0.55	0.7	0.98	
MDGRR-3	Glyphosate	ug/L	ND	ND	ND		
	Non-Ionic Surfactant	mg/L	ND	ND	ND		
	Flow	cfs	2.5 est.	31.4	13.4	10.45	5.72
	Dissolved Oxygen	%	54.7	82.4	83.0	82.9	61.0
	Dissolved Oxygen	mg/L	5.39	8.35	8.09	7.67	5.53
	Temperature	°C	16.2	14.5	16.5	19	20
	Conductivity	uS/mS	1025	657	682	777	837
	Specific Conductivity	uS/mS	1233	820	816	878	925
	Salinity	ppt	0.6	0.4	0.4	0.4	0.5
	pH		7.57	7.56	7.81	5.92	7.29
Turbidity	NTU	0.21	0.46	0.41	0.37	0.55	
MDGRR-4	Glyphosate	ug/L	ND	ND	ND		
	Non-Ionic Surfactant	mg/L	ND	ND	ND		
	Flow	cfs	3.50 est.	25.97	19.55	9.99	3.64
	Dissolved Oxygen	%	99.1	99.3	90.9	93	114.3
	Dissolved Oxygen	mg/L	10.31	9.92	8.67	8.13	9.54
	Temperature	°C	13.3	15.1	17.6	21.9	24.3
	Conductivity	uS/mS	858	659	720	819	905
	Specific Conductivity	uS/mS	1104	812	838	871	918
	Salinity	ppt	0.6	0.4	0.4	0.4	0.5
	pH		8.3	8.29	8.19	5.3	8.2
Turbidity	NTU	0.46	0.49	0.54	0.43	1.03	
MDGRR-5	Glyphosate	ug/L	ND	ND	ND		
	Non-Ionic Surfactant	mg/L	ND	ND	ND		
	Flow	cfs	3.5 est.	31.79	16.89	12.38	4.69
	Dissolved Oxygen	%	94.4	95.9	89.9	98.5	94.6
	Dissolved Oxygen	mg/L	10.09	9.62	8.66	8.95	8.24
	Temperature	°C	12.2	14.9	16.9	19.9	21.8
	Conductivity	uS/mS	681	640	670	737	790
	Specific Conductivity	uS/mS	902	793	793	816	841
	Salinity	ppt	0.4	0.4	0.4	0.4	0.4
	pH		8.18	8.24	8.09	5.24	8.07
Turbidity	NTU	0.29	0.26	0.36	0.19	0.5	
MDGRR-6	Glyphosate	ug/L	ND	ND	ND		
	Non-Ionic Surfactant	mg/L	ND	ND	ND		
	Flow	cfs	1.0 est.	27.00	13.44	6.77	1.53
	Dissolved Oxygen	%	99.1	97.6	94.8	96.3	102.3
	Dissolved Oxygen	mg/L	10.21	9.61	9.09	8.69	8.89
	Temperature	°C	14.0	15.9	17.4	20.1	22.1
	Conductivity	uS/mS	697	665	674	743	795
	Specific Conductivity	uS/mS	883	804	789	820	841
	Salinity	ppt	0.4	0.4	0.4	0.4	0.4
	pH		8.28	8.21	8.1	5.58	8.12
Turbidity	NTU	0.18	0.33	0.5	0.29	0.66	

ND = Non-Detect  
est. - Estimated Flow

**Matilija Dam Giant Reed Removal Project  
Water Quality Monitoring Results**

**Ventura Stream Team**

Site	Constituent	Units	8/4/2007	9/8/2007	10/6/2007	11/3/2007	12/1/2007
VR11	Glyphosate	ug/L	DRY	DRY	DRY	DRY	DRY
VR13	Glyphosate	ug/L	ND	ND	ND	ND	ND
VR15	Glyphosate	ug/L	ND	ND	ND	ND	ND

**WPD Special Sampling Events**

Site	Constituent	Units			10/11/2007	10/30/2007	12/10/2007
R7A08D	Glyphosate	ug/L			ND		
	Non-Ionic Surfactant	mg/L			ND		
R7A05D	Glyphosate	ug/L			ND		
	Non-Ionic Surfactant	mg/L			ND		
MDGRR-3	Glyphosate	ug/L				ND	
	Non-Ionic Surfactant	mg/L				ND	
R7B2400 d/s	Glyphosate	ug/L					ND
	Non-Ionic Surfactant	mg/L					ND
R7B2400 u/s	Glyphosate	ug/L					ND
	Non-Ionic Surfactant	mg/L					ND
MDGRRP-4	Glyphosate	ug/L					ND
	Non-Ionic Surfactant	mg/L					ND
MDGRR-3A	Glyphosate	ug/L					
MDGRR-3	Glyphosate	ug/L					
MDGRR-5	Glyphosate	ug/L					
MDGRR-1	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
R5-65 D	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
R5-8 U	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
R5B-DS	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
R7B-US	Glyphosate	ug/L					
	Glyphosate	ug/L					
VRCWD-4	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
MOCWD-1	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					

ND = Non-Detect  
est. = Estimated Flow

**Matilija Dam Giant Reed Removal Project  
Water Quality Monitoring Results**

**Ventura Stream Team**

Site	Constituent	Units	1/5/2008	4/5/2008		
VR11	Glyphosate	ug/L	DRY	DRY		
VR13	Glyphosate	ug/L	ND	ND		
VR15	Glyphosate	ug/L	ND	ND		

**WPD Special Sampling Events**

Site	Constituent	Units	1/7/2008	5/15/2008	5/29/2008	6/19/2008	7/10-11/08
R7A08D	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
R7A05D	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
MDGRR-3	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
R7B2400 d/s	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
R7B2400 u/s	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
MDGRRP-4	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
MDGRR-3A	Glyphosate	ug/L	ND				
MDGGR-3	Glyphosate	ug/L	ND				
MDGRR-5	Glyphosate	ug/L	ND				
MDGRR-1	Glyphosate	ug/L		ND			
	Non-Ionic Surfactant	mg/L		ND			
R5-65 D	Glyphosate	ug/L		ND			
	Non-Ionic Surfactant	mg/L		ND			
R5-8 U	Glyphosate	ug/L		ND			
	Non-Ionic Surfactant	mg/L		ND			
R5B-DS	Glyphosate	ug/L			ND		
	Non-Ionic Surfactant	mg/L					
R7B-US	Glyphosate	ug/L				ND	
R7B-DS	Glyphosate	ug/L				ND	
VRCWD-4	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					
MOCWD-1	Glyphosate	ug/L					
	Non-Ionic Surfactant	mg/L					

ND = Non-Detect  
est. - Estimated Flow