



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 (Plan¹, 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

| Routine Site Dates | Number of Samples | Glyphosate Detections |
|---------------------------|--------------------------|------------------------------|
| 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 |

¹ 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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Table 2. Summary of Routine Sampling by Stream Team

| Routine Site Dates | Number of Samples | Glyphosate Detections |
|---------------------------|--------------------------|------------------------------|
| 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

| Random Site Dates | Number of Samples | Glyphosate Detections |
|--------------------------|--------------------------|------------------------------|
| 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.



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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 |
| MDGRR-1 | Glyphosate | ug/L | DRY | DRY | DRY | DRY | DRY |
| | Non-Ionic Surfactant | mg/L | | | | | |
| | Flow | cfs | | | | | |
| | Dissolved Oxygen | % | | | | | |
| | Dissolved Oxygen | mg/L | | | | | |
| | Temperature | °C | | | | | |
| | Conductivity | uS/mS | | | | | |
| | Specific Conductivity | uS/mS | | | | | |
| | Salinity | ppt | | | | | |
| | pH | | | | | | |
| Turbidity | NTU | | | | | | |
| MDGRR-2 | 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 |
| | MDGRR-3 | Glyphosate | ug/L | 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 |
| MDGRR-4 | | Glyphosate | ug/L | 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 |
| | MDGRR-5 | Glyphosate | ug/L | 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 |
| MDGRR-6 | | Glyphosate | ug/L | ND | DRY | DRY | DRY |
| | Non-Ionic Surfactant | mg/L | ND | | | | |
| | Flow | cfs | <1.0 | | | | |
| | Dissolved Oxygen | % | 169.6 | | | | |
| | Dissolved Oxygen | mg/L | 12.69 | | | | |
| | Temperature | °C | 28.5 | | | | |
| | Conductivity | uS/mS | 769 | | | | |
| | Specific Conductivity | uS/mS | 721 | | | | |
| | Salinity | ppt | 0.4 | | | | |
| | pH | | 8.6 | | | | |
| Turbidity | NTU | 0.3 | | | | | |

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 | | | | |
| R7B-DS | Glyphosate | ug/L | | | | |
| VRCWD-4 | Glyphosate | ug/L | | | | |
| VRCWD-4 | 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