



# Jim May Park Biofilter An Example of an Integrated Plan Project



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**Water Resources Manager**  
**City of Santa Maria**  
**December 8, 2017**



## The Integrated Plan Concept

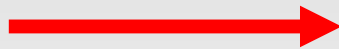
- Single plan designed to prioritize process for achieving water quality requirements.
- Supported by EPA and State.
- Intended to address substantially all of City's water quality requirements (MS4, POTW, TMDLs, post-construction) and achieve other benefits too (water supply, public support).
- Single vehicle for identifying projects and timelines for holding City accountable and measuring compliance.



Before



After





# City of Santa Maria Water Supply

- City demand-13,000 AF/yr
- State Water-16,200 AF/yr
- Groundwater-20 MGD =22,400 AF/yr
- State Water Annual Allocation 5%-100%
- State Water Annual Shutdown – 2-3 weeks





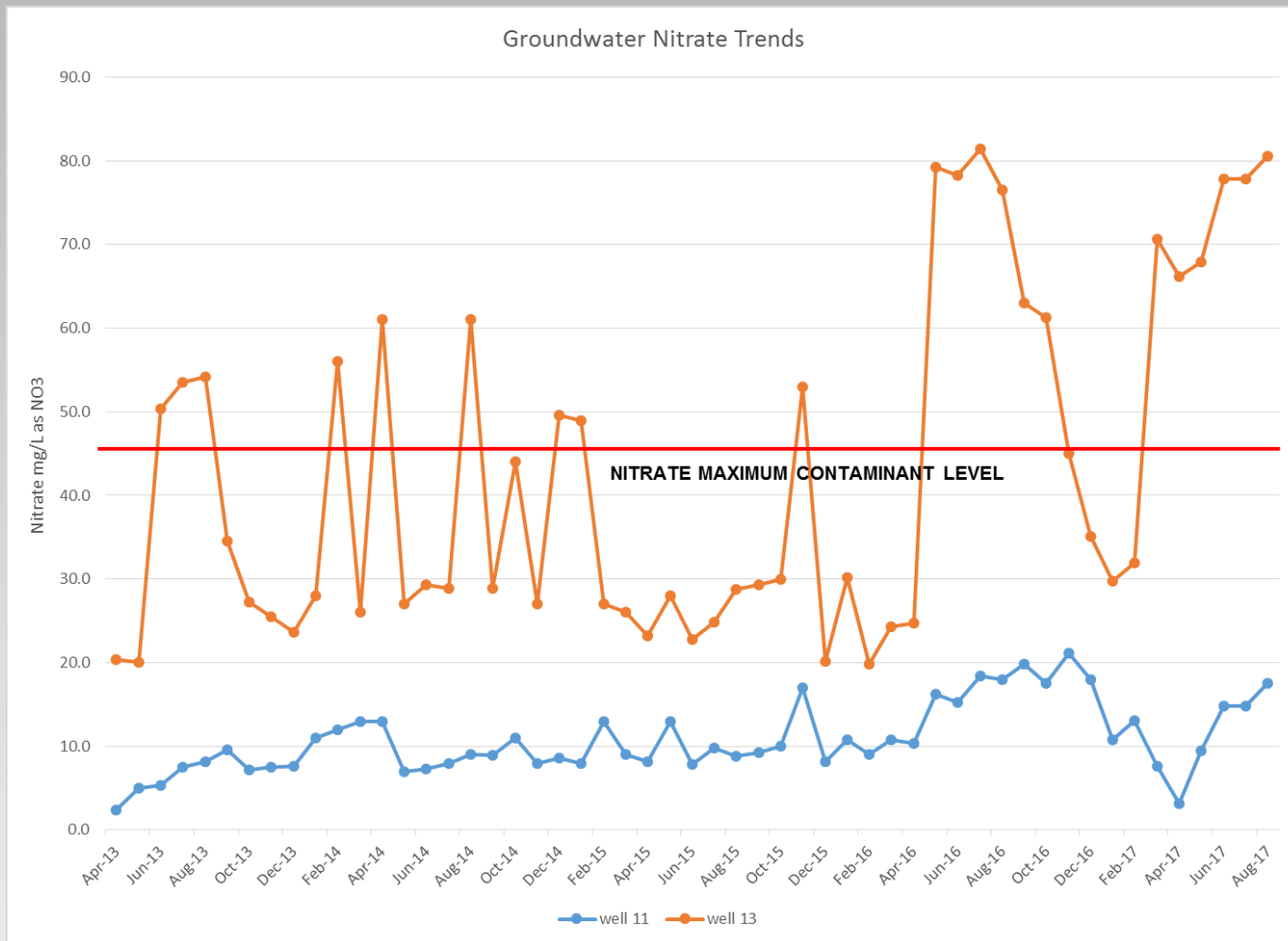
# City of Santa Maria Water Quality

Year	Maximum groundwater Production MGD	Nitrate, mg/L	Comments
2007	15	33	
2008	15	37	
2009	15	45	
2010	15	42	Packer in Well 14
2011	18	32	Connected Well 11 to Header
2012	18	33	
2013	18	26	
2014	20	25	Connected Well 6 to Header
2015	20	31	
2016	20	40	





# Historical Groundwater Nitrate Trends





# Santa Maria Valley Groundwater Assessment

- IRWM Planning Grant
- Salt and Nutrient Working Group
- 2012, report submitted 2013
- Modeled fate of salts and nutrients
- Conclusion: salts relatively balanced; nitrate levels started rising in 1980's, not balanced.
- Can be found at:  
<http://jimmayparkbiofilter.org> ,  
under Define the Problem - Links

Santa Maria Valley

## Groundwater Assessment

Santa Barbara County, California

Submitted to:

Salt and Nutrient Planning Workgroup  
Santa Barbara County IRWM Plan 2013

Date: October 9, 2013

Project No: 115210



*Robert Alay*  
Robert Alay, PE  
Project Director



*Samuel W. Schaefer*  
Samuel W. Schaefer, PE  
Senior Engineer

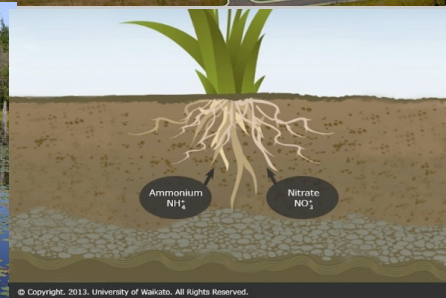
GEI Consultants, Inc.





# Ways to Remove Nitrate from Groundwater

- Activated sludge with anoxic zone
- Wellhead Treatment (RO or EDR)
- Wetlands
- Plant Uptake
- Biofilters





# Location

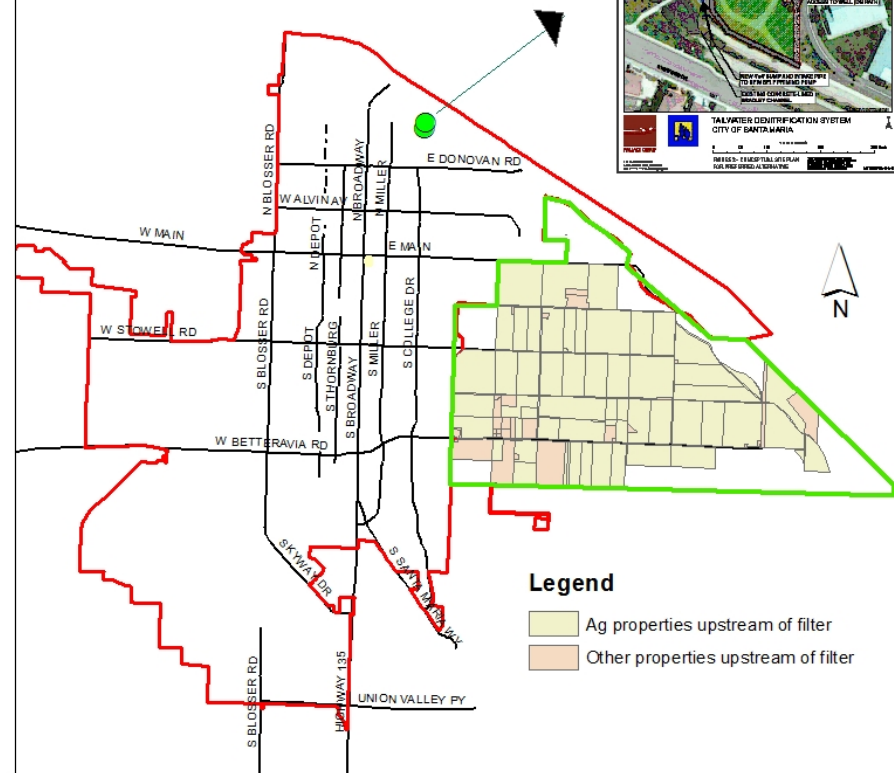
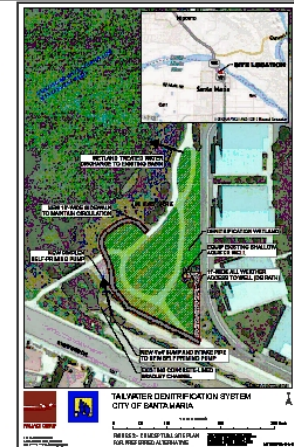
- Regional
- Ag tailwater
- Supplemental water
- Public land



City of Santa Maria  
 Jim May Park Agriculture Tailwater Treatment  
 Grant # 14 – 475 – 553  
 Proposition 84 Agricultural Water Quality Grant



The City recently secured a Proposition 84 grant of \$1,250,000 from the State Water Resources Control Board for an Agriculture Tailwater Treatment Project. This project will involve treatment of agricultural tailwater to reduce nitrite/nitrate, total suspended solids and other pollutants to meet Basin Plan objectives. A woodchip biofilter will be installed at Jim May Park to treat water from Bradley Channel which drains 5700 acres of agricultural land and 913 acres of urban land.





# RWQCB SM Valley TMDL Final Project Report

Table A-6. Existing estimated mean annual nitrate loads and percent reductions.

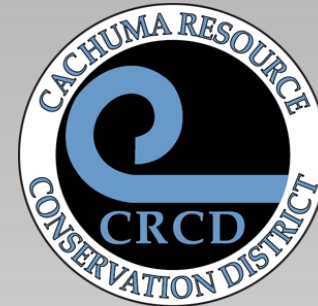
Water body	Site ID	Estimated Mean Annual Flow (cfs)	Mean Annual Conc. (mg/L)	Est. Existing Mean Annual Load (lbs.)	Mean Annual Loading Capacity (lbs.)	% Reduction Goal	NO3-N Numeric Target Used for Loading Capacity (mg/L)
Santa Maria River	312SMA	61.98	28.3	3,453,121	976,147	72%	Wet Season Biostim (8.0)
	312SMI*	29.90	30.8	1,813,117	588,674	68%	MUN (10)
Orcutt Creek	312ORC	7.20	35.5	503,228	113,403	77%	Wet Season Biostim (8.0)
	312GVT	4.08	36.4	292,726	64,335	78%	Wet Season Biostim (8.0)
	312ORB*	2.35	13.5	62,574	37,081	41%	Wet Season Biostim (8.0)
Green Valley Creek	312GVS	0.89	54.7	95,848	14,018	85%	Wet Season Biostim (8.0)
Main Street Canal	312MSD	3.86	21.6	164,303	76,066	54%	MUN (10)
Blosser Channel	312BCD	1.44	5.4	15,308	28,348	0%	MUN (10)
Bradley Channel	312BCU	0.49	11.9	11,460	9,630	16%	MUN (10)
	312BCJ	4.20	19.6	162,181	82,746	49%	MUN (10)
Nipomo Creek	312NIP	0.36	1.2	850	7,082	0%	MUN (10)
Bradley Canyon Creek	312BCC	0.17	11.0	3,602	2,620	27%	Wet Season Biostim (8.0)
Little Oso Flaco Creek	312OFN	1.68	41.0	135,853	18,887	86%	Year-Round (5.7)
Oso Flaco Creek	312OFC	2.44	38.6	185,430	27,382	85%	Year-Round (5.7)

[http://www.waterboards.ca.gov/centralcoast/water\\_issues/programs/tmdl/docs/santa\\_maria/nutrients/1sm\\_nut\\_tmdl\\_att2\\_projrep.pdf](http://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/santa_maria/nutrients/1sm_nut_tmdl_att2_projrep.pdf)



## Ideas, but no Money...

- Proposition 84 – Irrigation and Nutrient Management Grant
- CRCD about to return \$1.25 M to state
- Transferred grant to City as project manager
- January 2013 – feasibility study for regional biofilter at Jim May Park
- Need Santa Barbara County on board





# Design

- Typical Construction Project – Design by MKN and Assoc.





# Statewide Issue

- Expert Panel
- Conclusion—pump and fertilize (or in our case, treat)
- Ag Order contradictions

## Conclusions of the Agricultural Expert Panel

Recommendations to the State Water Resources Control Board  
pertaining to the Irrigated Lands Regulatory Program

in fulfillment of SBX 2 1 of the California Legislature

September 9, 2014

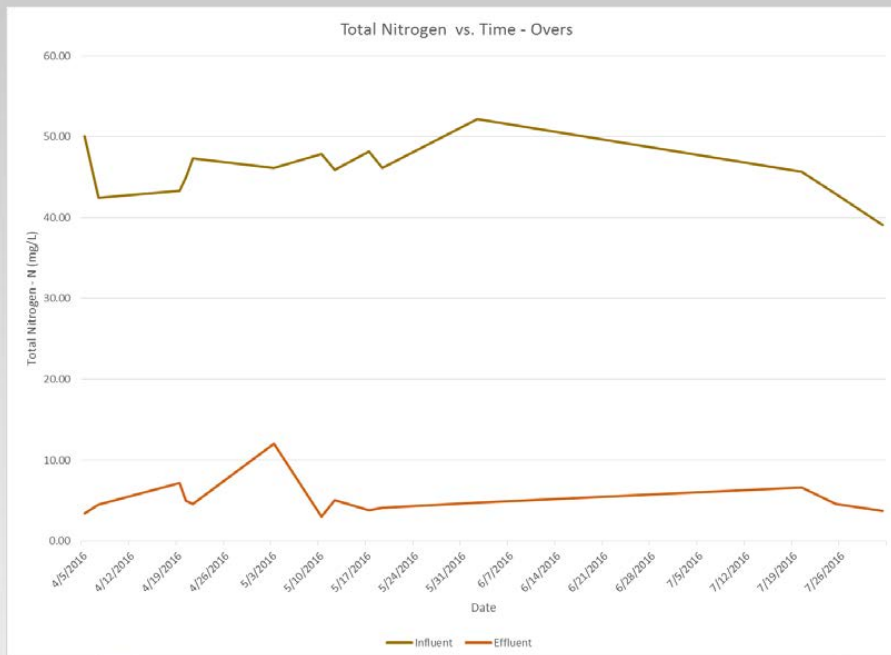


Irrigation Training & Research Center  
California Polytechnic State University (Cal Poly)  
San Luis Obispo 03407-0730



# Pilot Filter

- Which woodchips?
- Tested “overs,” pine, blonde wood
- Best result = overs





# Construction

- Whitaker
- Began Sept 2016
- Done June 2017

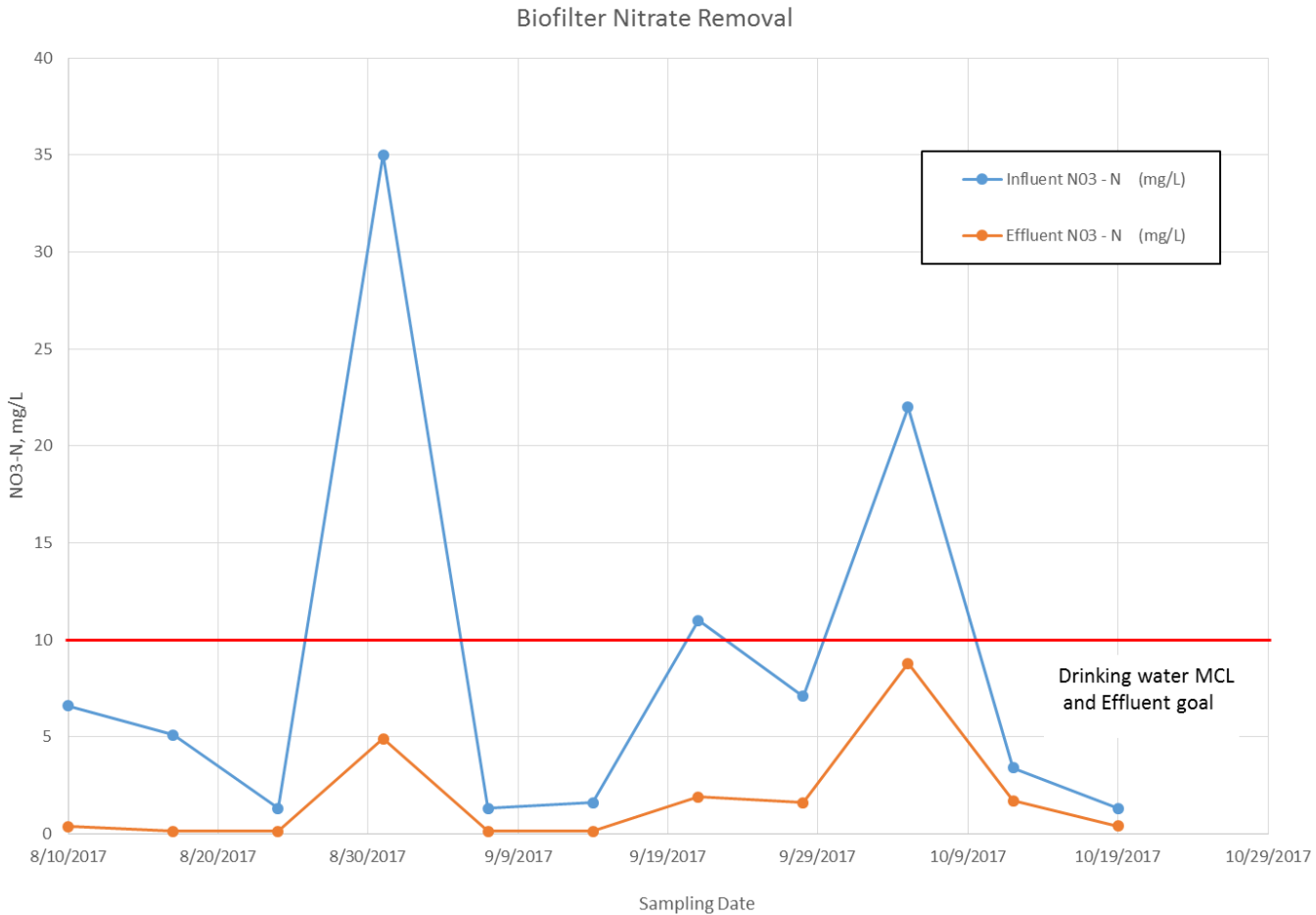








# Does it Work?





## Lessons Learned

- Plywood glue has urea, causing ammonia in the effluent to increase
- The type of wood matters. Pine was not as good at removing nitrogen as the “overs,” or leftovers from composting.
- It will be hard to remove nitrogen from water that has any appreciable biological oxygen demand (BOD). The pilot biofilter was first started up using wastewater effluent, but the carbonaceous bacteria outcompeted the nitrogenous bacteria resulting in no nitrogen removal.
- Nitrification requires alkalinity.
- Do not impede flow leaving the biofilter. The filter material reduced flow and had to be removed from the effluent piping.
- Try to build a filter without a baffle. A baffle was necessary because of the shape of the site.
- Plan for maintenance access points. Additional cleanouts and sumps were installed after the filter was completed
- The biofilter needs start up time to develop bacteria and to season the wood chips. The initial water leaving the biofilter was colored, foamy, and odiferous.



# Outreach

- Logo
- Website
- Permanent sign
- Presentations
- Letter offering free tech assistance
- Temporary construction sign



<http://jimmayparkbiofilter.org/>



## Circle back to Integrated Plan

- Jim May Park Biofilter was not a regulatory requirement, but an example of an Integrated Plan project.
- Design conditions no longer exist, due to Ag Order developments.
- Intractable problems like nitrate in groundwater need creative solutions and regulatory flexibility.



## Next Steps?

- We have a common goal – protection of water resources.
- Flexibility to maximize the potential benefit of the Jim May Park Biofilter.
- Further the concept of the Integrated Plan for a more holistic approach to water quality protection.



# Questions?

<http://jimmayparkbiofilter.org/>