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The Septic Matters Program

A Survey of Septic System Conditions in the Tomales Bay Watershed

Background

Contaminants relating at least in part to septic systems were found in Tomales Bay and in tributaries that flow into the Bay. Salmon spawning is known to occur in some of the tributaries. Marin County Environmental Health Services applied for grants to survey the condition of septic systems in close proximity to the Bay and to waterways in the Tomales Bay watershed. Grants were provided through the State Water Resources control Board and the Coastal Conservancy and inspections were made in the communities of Forest Knolls (19), Inverness (18), Lagunitas (13), Marshall (2), Nicasio 2), San Geronimo (8), Petaluma (2), Point Reyes Station (9), and Woodacre (62 – note an active community group encouraged participation).

As owner permission to review and test individual septic systems would have been unlikely, the Septic Matters Program was devised by Marin County Environmental Health (EH) to provide community education to homeowners while offering a free and confidential third party inspection and testing of the systems. It was felt that education regarding the function of septic systems and the impacts of failing or marginal systems would be a valuable foundation to the program. Additional site specific education was provided to individual homeowners who voluntarily requested septic system inspections. Inspection data labeled by community was provided to Marin County minus the specific address of the residence. A total of 135 inspections were done between 1/26/04 and 3/22/08. (Eleven additional inspections were made in Bolinas and Novato which are outside of the Tomales Bay watershed.)

From 1/26/04 to 1/31/06, 98 inspections (87 in the watershed) were made by Kit Rosefield, a septic system inspector with certifications through both the National Sanitation Foundation (NSF) and the National Association of Wastewater Transporters (NAWT). Kit held 18 Septic Social educational workshops in four different communities. When Mr. Rosefield moved his business to Tuolumne County, EH asked me to perform additional inspections. I was able to complete 48 septic system reviews from 12/3/07 to 3/22/08. My experience consists of nearly 30 years in onsite wastewater practice with both San Diego and Sonoma Counties, with the last seven years in private practice. I left Sonoma County in 2001 as Supervisor of the Well and Septic Division and am also a NAWT certified inspector. Kit Rosefield and I are both instructors for NAWT through the California Onsite Wastewater Association.

During the inspections, a number of problems were discovered, including failing systems, leaking tanks, failed pumps, and inoperational equipment. A combination of education, suggestion and assistance for repairs led to a number of corrections which has, at least in some way, contributed to beneficial effects on the quality of the ground and surface waters of the watershed.

Goals

The program was set up to offer community and individual homeowner septic system education and to provide a sampling of the condition and function of septic systems in close proximity to the Bay and to water ways of the Tomales Bay watershed. In addition, suggestions and assistance for system repair and improvement were to be provided.

Process

Through community educational meetings, newspaper ads, interested community groups, real estate office flyers and word of mouth, appointments were made at the request of homeowners to inspect their septic systems. Prior to meeting with homeowners, we pulled copies of septic system permits and plot plans from EH and provided those, where available, for the owner. I estimate that some level of septic system records were available for about 2/3 of the homes. Some people did not know what their system was comprised of or where some components were located. At that time, we offered educational materials and County lists of pumping firms, contractors and designers. We discussed needed repairs and offered suggestions as to how to what professional groups were most suited to do them. Common suggestions were for the replacement of tanks or systems, installation of fiberglass surface risers and effluent filters, tank pumping, and hook-up of surface graywater lines back into the septic tank.

Inspections were made, where possible, of the tanks, pump tanks, and any components of the system accessible from the surface such as valves and monitoring wells. A hydraulic load test meeting Marin County standard Memorandum #1 was performed where possible. Written reports were generated, usually on site, and handed to the homeowner. No copies were kept, giving increased credence to the confidential nature of the inspection. General information by community, minus specific addresses, was kept on spreadsheets (attached) for Marin EH.

As inspections came from voluntary homeowner requests, a truly random sampling program was not available. I believe, however, that given the similar site characteristics, system ages, and lot sizes for a majority of the homes, the findings offer a reasonably valid snapshot of overall conditions in some of these communities.

Onsite Wastewater Issues Observed in the Survey

1. *System Age* – The majority of the houses were from the turn of the century through the 1970's. Newer homes with more modern systems were in the minority. In relation to the average system lifespan generally estimated at thirty years, most of the systems viewed were 30-50 years old. Many of the system owners noted repairs had been done, most often without permits.
2. *Small Parcels* – As is often seen in older subdivisions, many of the lot sizes are small, often ranging from 8-15,000 square feet. The lots were often overdeveloped with homes, garages, driveways, decks, pools and other hardscape in relation to the space given to the septic system. There was often little or no fail safe or system replacement area remaining.
3. *High Groundwater (GW)* – Valley floor and flatter areas (such as Railroad Avenue in Woodacre tend to have high seasonal GW. I observed GW as high as 4 inches and many sites at 16-18 inches from the surface. These elevations typically flood both gravity septic tanks and dispersal fields that may be 3-6 feet deep. It is documented that such saturated soils provide for transmission of pathogenic organisms up to 1,000 feet. Anecdotal reports of heavy rain sheet flow were also mentioned by some homeowners.

4. *Small Systems* – Many of the systems are smaller or substantially smaller than would be required under today's more scientifically based standards. These conditions will likely result in faster accumulation of clogging bio-mat and a reduced system lifespan. In addition, smaller systems are more subject to hydraulic overload.
5. *Marginal or Shallow Soils* – In discussions with EH staff and anecdotal talks with homeowners, many of the area's soils are shallow or marginal, with standards gravity systems (the most common type found) poorly suited for adequate dispersal under these conditions.
6. *Additional Living Units* – Secondary living units were seen at 10-20% of the residences inspected, some existing without permits. This increases wastewater volume and stresses on existing systems.
7. *Proximity to Waterways* – Many systems are closer to waterways than current standards would allow, creating increased potential for contaminant transmission.
8. *Graywater Discharges* – A number of homes discharge graywater (laundry, showers, sinks) to the ground surface, ditches, or to unpermitted gravel filled sumps. As graywater carries pathogens, this increases the possibility of contaminants being carried offsite. This is done to relieve pressure on marginal or failing septic systems or occasionally by owners pro-actively reducing the load on their systems.
9. *Limited or No Fail Safe* – Most properties had limited or no system replacement area, especially if current setbacks from wells, waterways and structures were enforced.
10. *Reduced Access to Tanks* – Development such as decks and pavement stones have limited reasonably easy access to some tanks for pumping and diagnosis, resulting, in my opinion, in less frequent or no pumping and diagnostic checks of those tanks.
11. *Mosquito Breeding* – This was noted in several tanks or pump tanks with inadequate or poorly fitting concrete, fiberglass or wooden lids.
12. *Unpermitted Repairs* – A high percentage of repairs (Kit Rosefield estimated 60%) have been made without permits, leading to questions of adequate repairs and reasonable setbacks. Anecdotally, homeowners were afraid that if they sought permits, the County might reject them or require an unaffordable system. Also, there were concerns that the County may view other unpermitted work or second dwelling units and cause further problems. For some, it was an issue of philosophically not desiring any contact with governmental representatives. Some noted when there are problems with those repairs; however, the installer is often not interested in returning calls or correcting their work.
13. *Pre-code Tanks* – A modest percentage of tanks are redwood or, more rarely, bottomless, and are more likely to act like cesspools with reduced treatment and retention.
14. *Appropriate Repairs* – Most repairs have been "more of the same" gravity leach lines. With high GW and small spaces, the most appropriate repairs would be Bottomless Sand Filters, Mounds, or Advanced Treatment with Drip systems (on steeper slopes). These nonstandard type systems generally appeared to be functioning properly during the inspections. With price tags estimated at \$40-60,000, they are not well accepted by homeowners. In addition, Bottomless Sand Filters and Mounds may take up much or all of the available recreational space on a small property, an issue also not well accepted. Many such nonstandard systems we observed were required as the result of a property transfer negotiation or as a County requirement for a new house, additional bedrooms or a major remodel.

Although not a registered geologist, my work of nearly 30 years in this field with geologists and hydro geologists alerts me to note the obvious geological setting of these valleys. Essentially all surface and subsurface wastewater discharges in the valley settings experienced in this study eventually drain to the tributaries which in turn feed Tomales Bay.

Findings – Septic Tank and Dispersal Systems (135)

	<u>Septic Tank</u>		<u>Dispersal Systems</u>	
	<u>#</u>	<u>%</u>	<u>#</u>	<u>%</u>
<i>Acceptable</i>	82	61	80	59
<i>Unacceptable</i>	39	29	42	31
<i>Unknown/NA</i>	14	10	13	10

Please see the Appendices section for definitions of Acceptable, Unacceptable and Unknown. A point here is that there were 14 tanks that could not be examined.

Findings – Hydraulic Load Testing (135)

	<u>#</u>	<u>%</u>	<u>As a % of those actually tested</u>
<i>Excellent</i>	17	12.5	20
<i>Good</i>	40	30	48
<i>Satisfactory</i>	4	3	5
<i>Satisfactory / Marginal</i>	4	3	5
<i>Marginal</i>	3	2	4
<i>Poor</i>	4	3	5
<i>Failed</i>	11	8	13
<i>Unknown / N/A</i>	52	38.5	--

Please see the Marin County EH Memorandum #1 for definitions and testing procedure. A point here is the high number of tests which could not be performed to flooded leaking tanks, failed pumps, access or other problems. Of 135 systems, only 83 could be tested. Many of those not tested would have been considered Failed if we had chosen to test an already unacceptable dispersal system or flooded tank.

Assumptions

The basic site conditions are unlikely to change: small parcels, high GW, often marginal soils, close proximity to waterways, limited replacement area, and seasonally saturated soil transmission of contaminants.

With the status quo, conditions that are unlikely to change or that may worsen with time are aging (deteriorating) systems, small systems, graywater or other discharges, unpermitted system repairs and remodeling, mosquito breeding, reduced access to tanks, and creek contamination.

Approximately half the inspections were done during the dry months (May through September). It is surmised that if all the inspections were done during wet weather periods, the rate of systems classified as failures would have been higher due to elevated winter GW and saturated soils.

Conclusions

A problem exists with many older systems in the Tomales Bay Watershed. Although some of the communities we visited had too few inspections requested to form a valid conclusion, there seems to be a pattern with the older systems and smaller parcels. Systems will continue to age, resulting in an increasing risk for surface and subsurface contamination of waterways. There appear to be two main categories of solution whose engineering realities, environmental issues, cost and benefit remain to be studied in more detail. The first is the construction of onsite improvements, with the main impediments as discussed being cost and available parcel space. The second

potential solution would be a local community decentralized system or other public sewer. A properly sited community system would likely do more to keep wastewater from eventually ending up in the Bay after public sewer treatment. It is my experience that the common sewerage option has more ability to draw the grants or subsidies that would almost certainly be needed for either of the options.

Respectfully submitted,

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California Registered Environmental Health Specialist # 3826

APPENDICES

ABBREVIATIONS USED, DEFINITIONS, & INSPECTION SPREADSHEETS

Abbreviations and Definitions

Date

The date of inspection

Vicinity

Community in which the inspection was performed

Proximity to Waterway

Approximate distance from the septic tank and dispersal field to the bank of the waterway

Type of Waterway

A. *Perennial* – Year-round creek or waterway

B. *Ephemeral* – Seasonal flow in natural creek or waterway

C. *Intermittent* – Natural or manmade drainage courses feeding creeks or waterway

D. *Embayment* – Bay, tidal slough or estuary

Septic Tank Type

Block - Cinder block

Con - Concrete

FG - Fiberglass

Pla - Plastic

Rdw - Redwood

Septic Tank Condition

A - Acceptable – No significant deterioration; approved materials (concrete, fiberglass, plastic); major internal components in place

U - Unacceptable – Significant deterioration; unapproved materials (wood, block, metal, bottomless); missing internal components

Unk - Unknown or not applicable – Unable to view tank due to flooded conditions or lack of ability to view all or a portion of the tank

ET – (Enhanced Treatment)

- MF* - Media filter such as fabric or peat
- ATU* - Aerobic treatment unit
- SF* - Sand filter (prior to final dispersal)

Dispersal Type

- BSF* - Bottomless sand filter
- CP* - Cesspool
- DF* - Drainfield / leachfield
- Drp* - Drip
- Mnd* - Mound
- PD* - Pressure distribution
- SP* - Seepage pit
- Unk* - Unknown

Dispersal Condition

- A* - No sign of surfacing effluent, excessive hydrophilic vegetation, damage, erosion, a Hydraulic Load Test (HLT) of Satisfactory, Good or Excellent (S, G or E)
- U* - Any of the above factors or an HLT of Marginal, Poor or Failing (M, P or F)
- Unk* - Unknown or NA – Unable to test due to flooded tank, failed pump, leaking tank and / or leaking pressure transmission line

HLT – (Hydraulic Load Test)*

- E* - Excellent
- G* - Good
- S* - Satisfactory
- M* - Marginal
- P* - Poor
- F* - Failed
- NA* - Unable to test due to flooded tank, pump failure, lack of tank access, tank or line leaks

*See HLT testing protocol in Marin Environmental Health Policy *Memorandum #1*

Note:

In the spreadsheets seen below, I attempted to follow the format established by Kit Rosefield as much as possible to avoid any confusion. The only notable difference was the last column. Kit noted where possible when corrections had been made or were planned. I used that column for general comments.

Inspection Spreadsheets – Kit Rosefield – 1/26/04 to 1/31/06

Date	Vicinity	Proximity to Waterway		Type of Waterway		Septic Tank		ET	Dispersal		HLT	Corrections Made?	
		Tank	Dispersal	Type	Type	Type	Cond		Type	Cond		Rate	Y/N
1/26/04	Novato	35ft.	15ft.	Tidal slough	Pla.	U	-	-	DF	-	NA		
2/6/04	Novato	135ft.	102ft.	Perennial	Rdw.	U	-	-	DF	U	NA	Y	EHS permit # 04-05
2/6/04	Novato	120ft	80ft.	Estuary	Con.	A	SF	SF	PD	A	G		
2/19/04	Woodacre	54ft.	76ft.	Perennial	Con.	A	-	-	MD	A	G		
3/10/04	Woodacre	50ft.	35ft.	Perennial	Con.	A	-	-	PD	A	G		
3/10/04	Woodacre	83ft.	115ft.	Perennial	Con.	A	-	-	MD	A	G		
3/17/04	Marshal	6ft.	6ft.	Bay	Con.	U	-	-	DF	A	G	Y	Pumped, repaired, risers installed
3/18/04	Lagunitas	124ft.	94ft.	Perennial	Rdw.	U	-	-	DF	U	F	Y	Soliciting designers
3/18/04	Woodacre	53ft.	10ft.	Perennial	Rdw.	U	-	-	DF	A	G	N	No action, yet
4/2/04	Inverness	71ft.	80ft.	Perennial	Con.	A	-	-	DF	A	S		
4/2/04	Inverness	82ft.	112ft.	Perennial	Con.	A	-	-	DF	U	F	N	No action, yet
4/13/04	Novato	93ft.	70ft.	Intermittent	Fbg.	U	-	-	DF	A	G	Y	New tank to be installed
4/21/04	Petaluma	130ft.	110ft.	Intermittent	Rdw.	U	-	-	DF	U	NA	Y	EHS permit #04-P-20
4/22/04	Point Reyes	65ft.	55ft.	Ephemeral	Con.	A	-	-	DF	A	G		
4/23/04	Woodacre	130ft.	145ft.	Perennial	Fbg.	A	-	-	PD	A	G		
4/25/04	Forest Knolls	40ft.	20ft.	Perennial	Con.	A	-	-	DF	A	G		
4/28/04	Novato	60ft.	70ft.	Intermittent	Con.	A	-	-	DF	U	F	Y	Repair made to diversion valve
4/28/04	Point Reyes	75ft.	75ft.	Ephemeral	Con.	U	-	-	DF	U	F	N	No action, yet
4/29/04	Forest Knolls	110ft.	98ft.	Perennial	Fbg.	U	-	-	LF	U	F	N	Dual LF, 1/2 failed, soliciting des.
5/5/04	Woodacre	35ft.	20ft.	Intermittent	Con.	A	-	-	DF	A	S		
5/5/04	Woodacre	65ft.	35ft.	Perennial	Con.	A	-	-	DF	A	G		
5/12/03	Lagunitas	25ft.	10ft.	Ephemeral	Con.	A	SF	SF	PD	A	G		
5/12/04	Forest Knolls	67ft.	55ft.	Perennial	Con.	A	SF	SF	PD	A	G		
6/3/04	Forest Knolls	33ft.	21ft.	Perennial	Rdw.	U	-	-	DF	A	G		
6/7/04	San Geronimo	130ft.	90ft.	Ephemeral	Con.	U	-	-	DF	A	G	Y	Inlet and tank crack repaired
6/8/04	Pt. Reyes Sta.	120ft.	80ft.	Ephemeral	Rdw.	U	-	-	DF	A	M	N	Soliciting designers
6/14/04	Petaluma	35ft.	35ft.	Ephemeral	Con.	A	-	-	DF	A	G		
6/15/04	Lagunitas	85ft.	95ft.	Ephemeral	Con.	A	-	-	DF	A	G		
6/28/04	Pt Reyes Sta.	25ft.	35ft.	Ephemeral	Con.	A	-	-	BSF	A	NA		
6/28/04	Pt. Reyes Sta.	75ft.	85ft.	Ephemeral	Con.	A	-	-	SFT	A	NA		

6/28/04	Pt. Reyes Sta.	135ft.	120ft.	Ephemeral	Con.	A	-	PD	A	NA		
7/1/04	Woodacre	150ft.	130ft.	Ephemeral	Con.	A	-	DF	U	NA		
7/24/04	Bolinas	110ft.	85ft.	Intermittent	Con.	A	-	DF	A	G		
7/24/04	Bolinas	>100ft.	>100ft.	-	Con.	U	-	DF	U	NA	Repairs scheduled	
8/30/04	Bolinas	90ft.	95ft.	Intermittent	FG	U	-	DF	A	NA		
8/30/04	Bolinas	90ft.	115ft.	Intermittent	FG	A	-	DF	U	NA	Repairs scheduled	
9/2/04	Bolinas	133ft.	73ft.	Ephemeral	FG	A	-	PD	A	NA		
9/2/04	Lagunitas	87ft.	87ft.	Ephemeral	Con.	A	-	DF	A	G		
9/8/04	Lagunitas	90ft.	75ft.	Ephemeral	FG	U	-	DF	A	NA	Pricing tank replacement	
9/30/04	Bolinas	25ft.	20ft.	Ephemeral	Con.	A	-	DF	U	NA	Researching ET options	
1/10/05	Inverness	20ft.	20ft.	Embayment	Block	U	-	SP	U	NA	Hiring consultant	
1/11/05	Forest Knolls	40ft.	15ft.	Perennial	Con.	A	-	DF	A	G		
1/11/05	Forest Knolls	45ft.	20ft.	Perennial	Rdw.	U	-	DF	A	NA	Pricing tank replacement	
1/14/05	Inverness	50ft.	80ft.	Ephemeral	FG	A	MF	DD	A	NA		
1/14/05	Inverness	15ft.	20ft.	Embayment	Con.	A	MF	PD	A	NA		
1/18/05	Forest Knolls	20ft.	30ft.	Perennial	Con.	A	MF	PD	A	NA		
1/27/05	San Geronimo	60ft.	95ft.	Ephemeral	Con.	A	-	PD	A	NA		
1/16/05	Forest Knolls	105ft.	95ft.	Ephemeral	Block	U	-	DF	U	U	Considering options	
2/23/05	Woodacre	30ft.	20ft.	Intermittent	Con.	U	ATU	DF	U	NA	Hiring consultant	
3/17/05	Forest Knolls	75ft.	120ft.	Perennial	Con.	A	SF	PD	U	NA	System under repair	
3/29/05	Inverness Park	30ft.	20ft.	Intermittent	Con.	A	-	DF	A	G		
3/29/05	Inverness Park	130ft.	110ft.	Intermittent	Con.	A	-	DF	A	E		
3/30/05	Woodacre	30ft.	10ft.	Intermittent	Con.	NA	-	DF	U	NA	High groundwater - drainage issue	
3/30/05	San Geronimo	15ft.	60ft.	Intermittent	Con.	A	-	DF	A	E		
3/30/05	Forest Knolls	50ft.	50ft.	Ephemeral	Rdw.	U	-	CP	U	NA	Owner agrees replacement needed	
3/30/05	Forest Knolls	35ft.	75ft.	Perennial	Con.	A	SF	DF	A	NA		
4/29/05	Woodacre	40ft.	30ft.	Ephemeral	Con.	A	SF	PD	A	NA		
5/3/05	Lagunitas	45ft.	60 ft.	Ephemeral	Con.	A	-	DF	A	G		
5/3/05	Woodacre	75ft.	50ft.	Ephemeral	FG	A	-	SP	U	F	Repair in process.	
5/5/05	Lagunitas	30ft.	45ft.	Ephemeral	Con.	A	-	DF	A	G		
5/5/05	Woodacre	85ft.	60ft.	Ephemeral	Con.	U	-	DF	U	F	Recommendations made.	
5/16/05	Inverness	60ft.	50ft.	Ephemeral	Con.	A	-	DF	A	G		
5/18/05	Woodacre	65ft.	60ft.	Intermittent	Con.	A	-	DF	U	NA	Repairs scheduled according to owner.	
6/1/05	Forest Knolls	110ft	60ft	Ephemeral	Con	A	-	DF	A	G		

6/1/05	Woodacre	35ft.	20ft.	Perennial	Con.	A	-	DF	A	S		
6/7/05	Woodacre	65ft.	15ft.	Ephemeral	Con.	U	-	DF	A	G	Y	Inquiring about tank replacement
6/8/05	Forest Knolls	55ft.	75ft.	Ephemeral	Con.	A	-	PD	U	P	Y	Scheduled system service
6/9/05	San Geronimo	15ft.	35ft.	Perennial	Con.	A	-	DF	A	G		
6/9/05	Nicasio	50ft.	?	Ephemeral	Con.	A	-	?	U	F	Y	Selecting Designer
6/14/05	Lagunitas	150ft.	175ft.	Ephemeral	Con.	A	-	DF	A	G		
6/21/05	Lagunitas	75ft.	40ft.	Perennial	FG	A	-	DF	A	G		
6/22/05	Inverness	120ft.	130ft.	Ephemeral	Con.	A	-	PG	F	NA	Y	Electrical problem- repairs to be scheduled
6/22/05	Inverness	20ft.	150ft.	Ephemeral	Con.	A	-	PG	A	G		
6/24/05	Forest Knolls	25ft.	25ft.	Perennial	FG	A	-	DF	A	G		
6/24/05	Forest Knolls	35ft.	30ft.	Ephemeral	Con.	A	SF	PD	A	G		
7/12/05	Inverness	100ft. +	100ft. +	N/A	Con.	A	-	DF	A	G		
7/12/05	Inverness	75ft.	95ft.	Intermittent	FG	U	-	DF	A	G	Y	Client to have inlet fitting installed.
7/12/05	Inverness	100ft. +	100ft. +	N/A	Con.	N/A	-	DF	U	N/A	Y	Tank backed up, owner to contact contractor.
7/13/05	San Geronimo	75ft.	75ft.	Perennial	Rdw.	U	-	DF	U	N/A		Tank backed up, owner exploring options.
7/13/05	Forest Knolls	60ft.	30ft.	Intermittent	Con.	A	-	PD	A	G		
7/18/05	Inverness	60ft.	30ft.	Ephemeral	FG	U	-	DF	A	G		Owner contacting contractors for repair.
7/18/05	Inverness	75ft.	65ft.	Ephemeral	Rdw	U	-	DF	N/A	N/A		Tank deterioration disallowed HLT. Owner exploring tank replacement.
7/20/05	Inverness	100ft. +	100ft. +	N/A	Con	U	-	DF	N/A	N/A		Cracked tank not water tight. Owner exploring options.
7/21/05	Woodacre	55ft.	65ft.	Perennial	Con	A	-	DF	A	G		
8/18/05	Woodacre	55ft.	25ft.	Ephemeral	Block	U	-	DF	A	G		
8/24/05	Pt. Reyes	100ft+	100ft+	N/A	Con	A	-	DF	A	G		
8/24/05	Inverness	65ft	35ft	Perennial	Con	A	-	DF	A	M		
8/25/05	Lagunitas	70ft.	70ft.	Perennial	FG	A	-	DF	A	G		
8/29/05	Lagunitas	30ft.	N/A	Intermittent	CP	U	-	CP	U	N/A		Owner evaluating options.
8/29/05	Woodacre	30ft.	20ft.	Perennial	FG	A	-	DF	A	M		
8/31/05	San Geronimo	25ft.	25ft.	Intermittent	FG	A	-	DF	A	G		
9/20/05	San Geronimo	85ft.	65ft.	Perennial	Con	A	-	DF	A	G		
9/20/05	San Geronimo	120ft.	95ft.	Perennial	FG	U	-	DF	A	G		Owner considering tank

9/23/05	Lagunitas	40ft.	25ft.	Perennial	FG	U	-	DF	U	N/A	replacement
1/9/06	Nicasio	135ft.	100ft.	Perennial	Rdw	U	-	DF	NA	NA	Owner seeking consultant. Contacting contractors for tank replacement
1/31/06	Marshall	150r5.	110ft.	Bay	Con.	NA	-	DF	U	NA	Seeking designer
1/31/06	Forest Knolls	60ft.	25ft.	Perennial	Con.	U	--	DF	NA	NA	Contacting contractors for tank replacement
1/31/06	Forest Knolls	30ft.	15ft.	Perennial	Rdw.	U	-	DF	U	F	Seeking designer

Inspection Spreadsheets – Mike Treinen – 12/3/07 to 3/22/08

Date	Vicinity	Proximity To Waterway		Type of Waterway	Septic Tank		ET	Dispersal System		HLT	Comments re: the System Constraints
		Septic Tank	Dispersal System		Type	Cond.		Type	Cond.		
12/3/07	Woodacre	50	20	Intermittent	FG	Unk.	-	SP/DF	U	n/a	Tank/Risers flooded
"	"	20	10	"	"	A	-	DF	U	F	GW & Drainage issues
1/7/08	"	60	60	"	Rdw	U	-	DF	U	n/a	Tank flooded, GW, Graywater
"	"	60	60	"	"	Unk	-	DF	U	n/a	Tank flooded, GW
"	"	60	60	"	FG	A	-	SP	A	S/M	Graywater, GW(?)
1/11/08	"	100	100+	Perennial	Con	A	-	DF	A	E	DF in Driveway
"	"	70	50	"	"	A	-	SP	U	P	-
1/16/08	"	75	75	Intermittent	"	Unk	-	DF	U	n/a	Tank Flooded, GW
"	"	75	75	"	"	A	-	Unk	A	E	-
1/23/08	"	100	60	"	"	A	-	DF	A	E	-
"	"	100	75	"	"	Unk	-	SPs	U	n/a	GW into tank – pumped into SPs
"	"	75	60	"	"	Unk	-	SP	U	n/a	GW @ 4" – covering tank, Graywater
2/1/08	"	100	75	"	"	Unk	-	DF	U	n/a	Tank flooded
"	"	75	20	"	"	A	MF	MD	A	E	Pump very slow
"	"	25	75	Perennial	"	A	-	DF	A	S/M	-
2/8/08	"	100	20	Intermittent	"	A	MF	MD	A	E	GW @ 12"
"	"	100	100	"	FG	A	-	DF	U	n/a	GW @ 6-8", DF not working
"	"	40	80	Perennial	Con	Unk	-	PD	n/a	n/a	Pump not working
2/11/08	Pt. Reyes	40	90	Embayment	Con	A	-	MD	A	E	-
"	"	50	100	"	"	A	-	MD	A	E	Apparent gravel bed clogging

"	Inverness	100	80	"	FG	A	-	DF	A	E	Dual system – newer
2/19/08	Woodacre	90	60	Perennial	Con	A	-	DF	A	E	Graywater
"	"	85	65	Intermittent	Rdw	U	-	SP/DF	U	n/a	GW, SP not working
"	"	40	20	"	Con	A	-	DF	U	P	GW
"	"	20	30	"	"	Unk	-	SP	A	E	Deep outlet not uncovered

Date	Vicinity	Proximity To Waterway		Type of Waterway	Septic Tank		ET	Dispersal System		HLT	Comments re: the System Constraints
		Septic Tank	Dispersal System		Type	Cond.		Type	Rating		
2/27/08	Woodacre	30	40	Perennial	Con	Unk	-	DF	Unk	n/a	Pump tank flooded
"	"	100	100	Intermittent	"	U	-	DF	A	S/M	-
"	"	80	50	"	"	U	-	Unk	U	n/a	Tank flooded
3/14/08	"	50	50	"	"	U	-	Unk	U	n/a	Tank flooded, mosquito breeding
"	Forest Knolls	100	75	"	Con	A	-	DF	U	n/a	DF failing
"	Lagunitas	100	100	Perennial	"	A	-	DF	A	E	Tank leaking, pump in tank to DF
"	Woodacre	50	10	Intermittent	"	A	-	DF	A	E	Pump tank not watertight
3/17/08	"	100+	100+	Perennial	"	A	-	BSF	A	E	Newer bottomless sand filter
"	"	20	30	Intermittent	"	Unk	-	DF	U	n/a	Tank flooded
"	"	100+	100+	Perennial	FG	A	-	DF	Unk	n/a	Pump not working
"	"	20	30	"	Con	A	-	DF	U	P	Blockage or DF not working
3/19/08	"	100	80-100	"	"	A	-	DF	A	E	Evidence of High GW
"	"	100	80-100	"	"	A	-	DF	A	S	-
"	"	75	50-75	Ephemeral	"	U	-	Unk	Unk	n/a	Tank leaking, graywater
3/21/08	"	100	100	Perennial	FG	U	-	DF	Unk	n/a	Tank leaking & pump pipe leak
"	"	100	90	"	Rdw	U	-	SP	A	Unk	Leaks around outlet pipe
"	"	80	80	"	"	U	-	DF	Unk	n/a	Tank had not been uncovered
"	"	60	100+	"	FG	Unk	-	DF	Unk	n/a	Pump not working; both tanks full
"	"	35	45	Intermittent	Con	A	-	DF	U	F	DF under driveway
"	"	75	85	"	"	A	-	DF	A	S/M	Evidence of high GW
3/22	"	100+	100+	"	"	A	-	DF	U	N/A	GW, high water level in tank, Dual
"	"	90	80	"	"	A	-	SP	A	E	-
"	"	100+	100+	Perennial	"	U	-	DF?	Unk	n/a	Bottomless tank

Blank Sheet