

WATER SMARTS READER RESPONSE SURVEY RESULTS SUMMARY

The Jefferson County Planning and Zoning Department conducted a reader response survey in August of 2002 to evaluate whether the **Water Smarts** booklet helped people to better understand mountain ground water issues. The 10-question survey asked individuals not only whether they found the booklet useful, but also whether they would take action to protect ground water resources.

The survey was distributed to 1,000 individuals through direct mailings or distribution at community meetings and included the following groups:

- Participants in the Mountain Ground Water Resource Study (MGWRS)
- Well Seminar 1999 attendees
- Water Smarts steering committee members and technical experts
- Homeowner association members
- Jefferson County staff and officials
- Miscellaneous requests (Evergreen Community Plan attendees, Realtors, etc.)

69 of the 1,000 surveys were returned unanswered for various reasons, bringing the actual distribution to 931. 114 of the 931 were returned completed in September of 2002, for a response rate of 12% (all numbers have been rounded to whole numbers).

Question #1 asked, "Did you read the **Water Smarts** booklet?" 94% of the respondents read the entire booklet, while the remaining 6% read sections of the booklet. Question #2 asked "If yes to Question #1, what section or sections were most useful or not useful to you?" The eight sections were evaluated as follows:

	<u>Useful</u>	<u>Not Useful</u>	<u>Left Blank/Did Not Read</u>
1. Water Quantity	91%	2%	7%
2. Water Quality	90%	4%	7%
3. Legal Issues	83%	9%	8%
4. Lifestyle	83%	4%	13%
5. Questions & Answers	84%	6%	10%
6. Definitions	83%	4%	13%
7. Resources	83%	2%	15%
8. Tips	88%	1%	11%

Additional comments indicated that overall 60% of the respondents found sections of the booklet to be educational, while almost 10% noted that they already knew the information. 15% made comments on the format of the booklet, ranging from "easy to follow" to "confusing". Other miscellaneous comments noted that respondents wanted more information on specific topics (all of the additional comments for Questions #1-10 and the back cover are attached).

Question #3 asked "If you found the information useful, how could we distribute the booklet?" 73% of the respondents suggested a variety of ways to distribute the booklet. 36% of these respondents made suggestions on distribution methods, including: mass mailing, distribution at community

meetings and places, articles in newspapers, and website/on-line information. It was recommended that the following types of individuals receive the booklet:

- Mountain homeowners (i.e., existing, new, and prospective homeowners; well and septic users; and homeowner associations) 41%
- Realtors (i.e., real estate offices, title companies, and banks) 35%
- Other private individuals (i.e., well drillers and septic installers/pumpers; permit seekers, surveyors, and builders) 18%
- Public individuals (inspectors, government staff & officials, and water commissioners) 5%
- Educators/Activists (i.e., environmental groups, ground water societies, and League of Women Voters) 4%

A variety of public and private places were suggested to be points of distribution:

- Public places (i.e., government buildings, license stations such as Department of Motor Vehicles, all Colorado Planning and Zoning Departments, and courthouses; schools, libraries, fire stations, and police/sheriff stations) 37%
- Private places (churches, service clubs, chambers of commerce, county and state fairs, "Conifair," gas stations, supermarkets, and hardware stores) 11%

Question #4 asked "Did you learn anything new from the booklet?" 74% responded that they learned something new. Of those respondents, almost 25% made general comments such as the booklet provided a good overview and it "answered questions that I have wanted to ask, but have not known whom to ask." Respondents learned the most from topics covered in the following sections: water quantity (25%), water quality (11%), legal issues (16%), and well/septic tips and information found throughout the booklet (19%).

Question #5 asked, "Is there any information that you feel should be added to or deleted from the booklet?" 37% suggested additions, including: additional information on conservation (18%), water quantity (11%), water quality (18%), resources (13%), and well/septic tips and information (22%). Only 4% of the respondents suggested deletions, including technical details, repetitive information, and the resource section.

Question #6 asked "Did you find any errors/mistakes in the booklet?" 15% responded that they did find errors. Of these, close to 40% were minor formatting/typographical errors, while almost 60% noted mistakes in the content and technical details.

Question #7 asked people to indicate their drinking water source and method of sewage disposal. 77% were on wells and 78% were on septic systems. Whether a person was on well/septic or a public system effected the answers to Question #8, which asked, "Since reading the booklet, do you plan to do any of the following?":

	Already Doing	Will Do	Will Not Do	Not Applicable	Left Blank
Use non-toxic or biodegradable products	73%	13%	1%	3%	11%
Avoid disposal of certain items in sink/toilet	80%	11%	0%	4%	5%
Test well water periodically	34%	41%	3%	16%	6%
Inspect & maintain the well	43%	28%	3%	18%	9%

Reduce contaminants around well-head	56%	11%	1%	22%	10%
Follow well drilling tips	18%	8%	1%	61%	13%
Inspect septic system	57%	16%	1%	17%	10%
Pump septic tank periodically	65%	10%	2%	17%	7%
Follow septic system construction tips	24%	7%	1%	58%	11%
Research issues before buying property	20%	32%	0%	36%	12%
Other ... describe	2%	2%	0%	0%	96%

Other actions that people described included: installing water level monitoring, adjudicating a well, and conserving water. For those who checked “Will not do” for the above actions, Question #9 asked for an explanation. 12% of the respondents provided further explanations on why they would not take action. Most of these respondents (75%) were not planning on doing anything because they didn’t think there was a problem with their existing well and septic system. Another individual noted that it was too late for them to take action since they had already bought the property with an inadequate septic system. Another individual was concerned about the accuracy of certain well water testing places. One respondent noted that some non-toxic and biodegradable cleaners do not clean.

Finally, Question #10 asked respondents to describe themselves. Respondents could select all of the categories that applied, so the results do not total 100% as follows:

- Live in the mountains 81%
- Work in the mountains 26%
- Would consider living in the mountains 6%
- Realtor that sells mountain properties 4%
- Mortgage lender that finances mountain properties 1%
- Community/local/state official or leader 9%
(Planning Commissioners, water board members, county staff, etc.)
- Technical experience in ground water/related field 23%
(Geologists, hydrologists, engineers, environmental sciences, etc.)
- Educator/teacher 14%
(Professors, school teachers, etc.)
- Other (Retired, activist, don’t live in the mountains, etc.) 20%

Over 80% of the respondents live in the mountains. Nearly one-quarter of the respondents had technical experience in ground water and related fields, which explains why so many detailed comments were received on technical issues.

More than half of the respondents provided additional comments on the back page. The comments generally praised the booklet and offered technical suggestions on additions and corrections. A recurring comment recommended distributing the booklet to all mountain Realtors and newcomers; some even recommended that the booklet be required reading prior to purchasing mountain property. Several recommended that the topics be presented to schoolchildren. Others noted that the booklet was too long and should be presented in a brochure format. Many recommended that more information be included on the limited carrying capacity of the Front Range, water tables, overall water cycles, including drought years, and more conservation tips. Finally, several respondents recommended enacting minimum lot size regulations and managing growth.

We are providing these survey results to the Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE) who funded and administered respectively, the publication of **Water Smarts**. These results will also be sent to 62% of the

respondents who requested them. If you would like more detailed information on the survey results, you may contact Signy Mikita by phone (303) 271-8734, by e-mail smikita@jeffco.us, or by mail: 100 Jefferson County Parkway, Suite 3550, Golden, Colorado 80419-3550.

Fill-in-the-Blank Answers for Questions #1-10:

2.A Water Quantity

#	Comment
27	Add info on age of water in aquifer, water can be very old in some aquifers.
38	Good review for us, reminds us what to do & when
58	Conservation
67	Upper right figure needs water table! But, does not address well yields and average usage/home (i.e. the 5 gallon example is not meaningful)
72	Ground water perspective
155	Already knew this
285	Explains fractured rock
309	Mountain areas soil & aquifer ability not to hold water
352	We always conserve
359	Educational for my wife
374	Easy to follow
377	Drought conditions
394	I guess I need to go through some of the web sites to find this?
402	Answered question I had not thought to ask
436	Well depth info
456	Info is confusing – needs editing & organizing
557	Need more emphasis on limits
580	I just didn't have the "whole picture".
593	Emphasize conservation
615	Previously learned
727	Source of water
802	Defines differences
818	I need to know as much as possible!
869	Put perspective on amount
935	Good basic explanations
966	Understanding
971	Educational
972	"Bucket" comparison very good! Good overall review

2.B Water Quality

#	Comment
58	Timely testing
67	Average depth to static water is not meaningful because of topography.
72	Septic importance/radon
138	Good info about how ground water is vulnerable to contamination.
147	Explained issues that I did not know existed.
155	Knew most, but p. 7 "testing" was great
281	Will test
285	Explains problems & solutions

309	Take for granted	
346	Always a concern	
352	Should be tested ever so often	
359	Educational for my wife	
374	Easy to follow	
377	Information on well-water tests	
392	I'm a geophysicist & understand	
394	Where/who do I go to for testing, especially for the more specialized tests?	
402	Informative	
436	Already familiar to me	
456	Would benefit from editing, the word "static" is never defined	
557	Doesn't contain specific data	
593	Use public supply	
615	Previously learned	
727	Background	
818	I need to know as much as possible!	
869	Everyone must participate & maintain clean water.	
935	Liked the "What to test for" section	
971	Educational & reference	
972	Good explanation of septic and testing	

2.C Legal Issues

#	Comment	
58	Ownership	
67	Sidebar is too long, should address homeowner in this context.	
72	Great summary	
155	Complicated system made easy.	
218	Well permit - usage	
238	A little over complicated.	
283	Too hard to understand.	
285	Get permit & drill prior to building.	
309	People not aware	
346	Just drilled a new well last year.	
352	You need to check up on laws.	
359	Explains "water rights"	
374	Explained well	
402	Things I did not know	
436	Well permit info	
453	Our division is settled and full.	
456	Excellent info – needs organizing.	
557	Some misinformation	
593	Public supply	
615	Previously learned	
727	Too much on surface H2O	
802	Good overview	
818	I need to know as much as possible!	
869	Good concise overview	
873	Very good, so much more to it than known	

935	The info on well permits	
972	Most people are unaware of "rights".	

2.D Lifestyle

#	Comment	
58	Conservation	
67	But section is misleading particularly relating to ppt. (i.e. recharge)	
72	Questions to ask	
138	Tips on septic systems & questions to ask before buying	
155	p. 14 chart is excellent	
281	Not worth it	
285	Good warning	
309	People not aware	
352	Yes, but need to check wells & pumps	
359	Educational for my wife	
374	Explained well	
402	Informative	
436	Familiar info	
593	Previous private well	
615	Previously learned	
873	Good issues brought to attention	
935	The septic system info	
972	Again – re: septic info	

2.E Questions & Answers

#	Comment	
58	Contaminants	
67	Much of this is repetitive w/text. Maybe much of text should be in this format.	
72	Quick answers	
138	Good legal questions	
155	For quick reference	
285	Good information	
309	People have a lot of questions	
359	Educational for my wife	
377	Area not knowledgeable on	
392	I'm a geophysicist & understand	
394	Where do I find out what my well is legal for (permit type)? [OK, I found it]	
402	It did just that	
453	I knew the answers	
557	Some problem with legal question	
615	Previously learned	
727	For reference	
802	Repetitive to text	
935	Good FAQs	
957	Were covered previously	
972	Answered a lot of general questions	

2.F Definitions

#	Comment	
27	I would add groundwater divide	

67	But, need definitions of recharge, water table, some are never mentioned in text.	
72	New terminology	
138	Good reference for terms used throughout booklet.	
155	Definitions always useful	
285	Well defined for the public	
309	Better understand content	
359	Educational for my wife	
374	"What are pros & cons of well adjudication" Sec. Paragraph – should not be included when it comes to water, we want everyone to follow the law.	
377	Education	
392	I'm a geophysicist & understand	
402	If unsure about	
615	Previously learned	
727	Self explanatory	
972	Answered a lot of general questions	

2.G Resources

#	Comment	
72	Additional help & info	
138	Good list of agencies which provide services as well as information regarding water.	
155	Always helpful	
285	Good list of resources	
309	Follow up	
352	Where to check if you have a problem	
359	Source for info on my well	
377	Agencies to contact	
402	It will help me to locate some answers	
453	Your book has the answers	
593	Reminders	
615	Previously learned	
727	Local contacts	
894	Very helpful	
935	Ok – liked the explanation of who does what.	
957	Don't need now, but good to know.	
972	Always need directions	

2.H Tips

#	Comment	
58	Seal maintenance	
67	OK – but could be incorporated with questions	
72	Eye-catching, good synopsis	
155	Best part – need a p. 7 type for ISDS	
285	Good idea	
309	Interesting & useful	
346	Helpful	
359	Useful	
377	Better water & septic management	
402	Useful	
445	A very well done booklet, full of info. Congratulations!	
456	Sidebar are good, but need to be shortened.	
505	Future issues to be aware of	

518	All of these made me think about my own well and how I usually take it for granted.	
558	Some duplication	
574	Refreshed my memory as to the information.	
593	Reminders	
615	Previously learned	
708	Boxes too dark & type too small for easy reading, especially by us older folks.	
802	Picture of typical well	
805	I generally found the booklet to be well written, explaining complex issues and terms in a coherent, thoughtful manner.	
894	Very helpful	
935	Good encapsulations of info	
966	Continued awareness	
972	Graphics are very eye-catching	
983	I believe it is a useful document – I suspect more for the urban dweller who is contemplating moving to the hills – those that live there I suspect are quite well aware of most of the data included in the pamphlet.	

3. How to Distribute Water Smarts

#	Comment	
No #	All mountain home owners and well users	
26	Mass mail, county and state inspectors, well drillers, septic pumpers, realtors, environmental groups	
27	Junior High school, Middle school kids	
38	At community meetings, in churches, schools, real estate offices, banks, public offices, (license offices)	
56	Through the mail	
58	High Timber, Courier, Hustler, etc.	
60	Distribute at any community meetings	
72	Provide to Colorado Geological survey for inclusion in their public distributions. Local/State ground water /environmental societies, HOA's [homeowners'associations]	
74	As needed – by inquiry	
103	Make it available in court houses & "Amax" office of Health & Safety	
112	Realtors	
125	To all mountain homes on well water	
138	Mail, newspaper	
155	State wide distribution to Planning & Zoning Depts. For distribution to permit seekers.	
194	Through realtors / surveyors / land owner associations	
206	By direct mailing or through realty offices	
218	Condense and send to all well/septic owners	
220	Through realtors, banks, for buyers	
259	Mass mailing and required distribution at real estate transactions	
274	Provide to realtors, have on web	
281	To potential builders	
283	All realtors should require new homebuyers to read it. They could distribute it.	
285	It should be distributed to all people who apply for a well permit or buy property in the mountains.	
288	Public libraries, license renewal stations in mountain communities and order on line	
297	To those applying for a well permit	
309	Contact homeowners associations, put articles in newspapers, make realtors & lenders more aware of potential problems with wells & septic systems, legal rights to buyers after purchase of property.	
335	Should be available to all realtors & everyone who transfers a deed on a property should	

	receive one (new homeowner).	
340	Mail	
346	I'm a tax payer, also very nice book, seems expensive – distribute to new how owners at closing	
352	Do not know	
359	Homeowners associations, realtors, fire departments, sheriff, service clubs, churches	
374	Through title companies, real estates offices	
375	Owners of record	
377	Just as you are doing now	
379	On internet & library	
384	County offices, Jeffco public libraries	
386	This booklet should be available to all Coloradoans!	
392	To the County Commissioners!	
394	Make sure all new mountain residents get it.	
401	To all people on wells in our county	
402	Public libraries & Department of Motor Vehicles	
406	Mailing probably best – could try internet	
418	You are doing great.	
436	Via real estate agents, via homeowner associations	
439	Homeowners assoc. w/rep from Colorado Dept.	
445	Mailbox or homeowner associations. I will take 30 for our own association.	
446	Schools	
450	Both at state and county fairs	
452	To home owners in area	
453	Contact real estate agents	
456	Bulk mailing to all 285 Corridor residents, require realtors to give a copy to ALL prospective home/land buyers.	
457	Court houses, schools, libraries	
495	Mtn. Realtors, libraries, home owners assn. & city planners	
497	Realtors, Water Commissioners, League of Women Voters	
510	Realtors, schools	
511	How are you distributing it now?	
518	In the lobby area of Planning & Zoning & with new residential building permits	
540	Have available outside Hearing Room 1 for PC, BCC hearings, high schools serving foothill communities	
557	Public meetings, copies for realtors, well driller, septic tank installers and county building permit distribution	
566	Give a copy to new people coming into the area!	
574	Via realtors, consider <u>requiring</u> prospective buyers and sellers, including their realtors, to sign that they have read and understand the booklet.	
593	People using private well or well-in-common	
629	Make sure every new home owner gets a copy	
651	Don't know	
708	Through realtors to new home buyers	
723	Mail to existing households	
727	Library, realtors	
788	Mailboxes, libraries, gas stations, with local publications (Hustler, Serenity, Mountain Connection, High Timber Times, Canyon Courier)	
800	All new house hunters – (via real estate agents?) through homeowners associations	
805	As part of every home sale transaction, libraries, well-drillers, septic companies and homeowner associations	
807	Supermarkets, hardware stores, mail, websites	

808	Online on web site, also give to other mountain counties to use	
818	Home owners associations, special meetings, web site, mail	
819	Voting lists	
821	Provide copies of the booklet to each of the homeowner associations for distribution to their members.	
869	Mountain realtors, mountain schools, maybe just a flyer – those interested may then pick one up at your school office	
890	Every school in the mountains to receive many copies	
912	Give it to a friend!	
935	Homeowners associations, realtors	
957	I think everyone should have one, but whether they would read it is another question.	
966	By mail, grocery store, newcomer welcomes	
971	At the Conifair	
972	I realize it would be expensive, but mailing it will really catch the kid's eyes with the graphics!	
983	Possibly through the school system, say at the junior or senior high level	

4.A YES – Learned anything new from Water Smarts

#	Comment	
26	200 ft. from septic – info to gather for future	
27	Evapotranspiration could re...?	
38	Some new terms	
56	Septic system maintenance and use	
58	Small rock fractures, aquifer capacity	
60	Meaning of well permit	
72	It's my profession	
74	The variety of household waste that contaminates water	
103	Just a refresher for a geologist/realtor	
112	If fluoride test high, then also test for radioactivity	
138	What water rights are, what an augmentation plan is	
147	Did not realize some of the health concerns, also legal matters & did not realize that we needed our well tested periodically. Also, learned about the H2O filtration > an aquifer... process of mountains Vs plains.	
155	Water law made clearer	
194	MGWRS update	
206	Bits of all articles	
218	Overview	
220	No but, I will keep it for reference	
226	I did not realize mountain water could be quite contaminated because of the groundwater system.	
259	I'm in the business so I know most of this but, most people don't and this is a great resource	
274	Information under tip on p. 12	
283	Geological info	
288	The water rights laws	
297	Water cycle in a fractured rock environment	
308	More clear on how wells are fed w/water	
309	Soil types, aquifer types & their ability to hold water	
335	How the water from a well surfaces to the top, general maintenance	
340	Well permit record, well permit limitations	
345	Nitrate toxicity	

346	How the well works exactly	
352	Where water is found in fractured rock	
359	Water rights – water use rules	
377	Aquifer structure and information	
379	I built my own home, but you always learn something.	
384	Adjudication of wells	
386	Of most interest is the well construction & the septic info	
392	That Jeffco learned something	
394	Details of recommended/necessary tests	
401	On testing for water quality	
402	Answered questions I have wanted to ask, but have not known who to ask	
406	Legal aspects of wells	
436	Government involvement in water	
439	How I get my water	
445	No, but this is my professor	
446	Average static water level for Turkey Creek drainage	
450	The magnitude of the difference between water availability in sand and gravel and in fractured rock	
452	Yes, but I heard the author speak on the subject years ago.	
453	I've lived here 25 years and know the system.	
456	Gained a much better understanding of where our water comes from and how mountain wells work.	
457	Septic systems	
495	Need for well permits	
497	Learned a great deal from the reviews (prior to printing)	
503	That a 5 gallon bucket of fractured rock holds 3 teaspoons of water	
505	Questions to ask	
511	Teaspoon = 0.156 oz.	
518	I hadn't given the septic system much thought, as to the pumping (or not) affecting <u>ground</u> well water.	
540	Amount of water held in 5 gallon of sand gravel vs. fractured rock	
566	Very informative- good overview	
612	Sections of a well	
615	Permit restrictions	
625	Did not know that the fractured rock is a poor aquifer.	
629	Water pump diagram, septic tank usage, etc., water rights	
636	Groundwater mod....? Info	
651	Know more about the structure of wells & septic systems	
708	Evapotranspiration figures for Jeffco 75%-97%!! Wow	
723	Well operation	
724	Well diagram, water cycle more completely...	
727	Local contacts, quality issues	
777	I should test water quality.	
788	A lot of things – highly informative	
800	No, but I'm very knowledgeable about the situation because I'm active in the Bear Mtn. Assoc.	
802	Typical well view on p. 11	
805	No, but I have been following this subject for 15 years.	

807	Amount of water in rock	
808	Egg shells shouldn't go in a septic system	
818	Water cycle	
819	Difference between exempt well and non-exempt well	
821	Much of what is in the booklet I already knew, but I commend you for how well it is written and presented.	
869	Water rights and well permit types	
873	Too much to list, very informative.	
890	See back page	
894	I won't bore you – (Lots !)	
926	Inability of mountain soils to absorb water	
935	Different kinds of well permits	
957	I did not know not to put bones or egg shells down the disposal. Also, that well water should be checked yearly. I also learned more about water rights.	
966	In depth descriptions – fractured aquifers	
971	Mostly top two sessions – did not know most of section	
972	Graphic at center of book was very informative also, I now understand adjudication!	
983	If not learn – at least clarify and focus many thoughts and ideas	

5.A ADDED

#	Comment	
No #	Use of "gray water"	
26	What changes are acceptable in streams?	
27	Expand definition e.g. groundwater divide, isotope [isotope] aging	
67	Water as a renewable resource, better descriptions of <u>recharge</u>	
72	References: CO Geological Survey, CO Groundwater Assoc.	
103? often contain calcite that leads to mildly hard water.	
112	More details throughout	
138	More info on water conservation facts about amount of water used for washing machines, dishwashers, showers, etc.	
147	Where to get H2O tested (state vs. private)?	
155	Realizing that frequency of use determines how a time line should be presented	
194	A table of enforcement of water use by agency	
281	Emphasis on pollution	
285	Should stress, that even if you are on top of a mountain your well can receive effluent from someone else's septic system	
359	Geologic help in siting wells?	
374	Before you can install a septic system you must get a permit from the County Health Dept. and a licensed engineer <u>must</u> design it. We replaced our system and this is what we were told. The term "should" could be replaced with "you must".	
377	Exact level of concern for some contaminants	
386	How can I find out my well depth?	
392	More about conservation	
394	Names of facilities capable of doing all water tests that may be needed or wanted	
402	Collection and use of gray water for outdoor watering of flowers and trees	
406	Maybe more on conservation	
445	Very complete, keep it as is.	
450	A table listing the common groundwater contaminants and the maximum level for drinking water	
456	Please make it VERY clear that there probably is NOT sufficient water for continued growth,	

	it's CRITICAL that we all become aware of this, realtors are not sharing this info.	
511	More on use of household stuff, particularly those with p. 04	
540	Maybe show what depth newer wells are drilled vs. wells 3-5 decades ago, if there is a trend.	
557	See detailed letter for some examples of needed changes.	
566	Not that I know of	
574	A discussion about the potential impact of additional wells	
580	More details about maintenance service needed. Please deal with the issue of septic system additives that are advertised. I'm still not clear how to obtain a service provider who won't rip me off. Price ranges (w/year) would be helpful.	
600	When you see someone using the water for watering a lawn – who do you call?	
651	Water quality issues related to livestock, what's safe what's not	
708	More on need to conserve and not water outdoors	
723	Where to obtain copy of "well log"	
777	More info on how to test water quality	
788	Where can I see the full MGWTRS? Where do I get the well water testing phone #?	
800	Symptoms of a drying well and what to do	
805	The costs of well-drilling, the fact that county Planning and Zoning offices do <u>NOT</u> keep data on areas where wells are going bad, nor does the state engineer's office except in the individual records. Properties with wells are very much "Caveat Emptor"! Also, more info on effective pump tests would be good.	
808	More detail on well maintenance	
818	More tips on conservation	
819	Recirculating hot water - with same water because it is already hot	
821	See back page	
935	Some specifics – how often to have septic system pumped for typical family, etc.	
957	I would have liked to have an estimation about how often to pump septic system.	
972	No – it's a wonderful job on everyone's part!	

5.B DELETED

#	Comment	
74	Low flow shower heads as a conservation measure. Every conversation I've had concerning this topic involved people saying it makes them take longer showers.	
147	No	
510	Lots of repetition, but that's probably ok.	
625	Resources	
727	Page 7 "Nitrate is a contaminant that..." last two sentences - delete	
788	Water rights vs. in.....?, interesting but only in certain circumstances. Leave in by all means, but if cost needs reducing – 2 nd l.....???	

6.A YES – Errors/mistakes

#	Comment	
67	Much of the GWT recharge is from wet spring snow storms. This is much more efficient than the implications from 75% to 97% of ppt. evaporated (2 yr. Study). These figures are misleading.	
72	The exposure pathway for radon in ground water is inhalation from out-gassing no ingestion.	
238	Page 18, Q&A – Blasting –Jeffco Health <u>does</u> regulate blasting for leach field installation.	
274	See back	
285	The definitions were too broad – design them for the mountains, i.e. why mention feed lots for nitrate.	
335	No, not that I noticed.	
374	Clearer defined household & domestic livestock could be confusing (page 20 - different types	

	of wells).	
503	I've emailed Jean Schwartz about the locations of the errors I found.	
505	P. 17-2 nd question, 4 th sentence verb, P. 18 less/fewer	
511	More than trace of N02 + H03 in 70's	
518	I made corrections and gave them back.	
540	No, but the word "typically" is used a lot, perhaps alternate w/"often"	
557	See examples described in my letter	
723	Page 16, 2 nd column, 3 rd paragraph "worse enemies" (worst?)	
808	Isn't groundwater one word??	
869	Pages 6 & 7 text next to page number should be 'water quality'	
983	Nothing serious	

8. PLAN ON DOING - Other...describe

#	Comment	
72	Install water level monitoring	
194	Adjudicate well	
309	Do better research before buying a house in the mountains	
511	Fish more often	
873	[not] waste water	

9. WILL NOT DO

#	Comment	
220	I have no reason to suspect a problem.	
281	Well is okay with motor not old	
345	Septic system used for gray water only, house has a C.....? Maltrum C.....? toilet system	
394	I have looked for places that test water for various contaminants. Pool water testing places do some tests, but I wonder about the accuracy.	
439	Already have well/septic	
557	Don't live in the mountains and don't own private well or septic	
566	Just replaced well pump last month, and hopefully pump installer inspected & put well back in proper order.	
574	Had I been informed by my realtor or by notice from Jeffco, I would have researched the issues before buying my house, which included a permitted well, but an inadequate septic system.	
580	Non-toxic or biodegradable – I use some, but some just don't clean.	
625	I've been drinking well water for 26 years without any ill effects. The septic system was pumped 10 years ago and it was in excellent condition then.	
629	I won't test the water unless a problem arises. The water from my well has been great for 21 years.	
723	Don't need to construct septic, not planning on moving	
727	System does not need to be pumped.	
873	Waste water	

10.F Community/local/state official or leader

#	Comment	
38	Involved in community planning	
60	Planning Commission member	
67	Member & Chairman, Mount Vernon Country Club Water Committee for 45 years	
238	Health department employee	
274	State Engineer's Office	

345	Regional environmental coordinator for US? 1977-1980	
505	EPA rep.	
558	Jeffco Planning Commissioner	
926	Plumbing inspector, Jeffco	
972	Husband – President of Indian Hills Water Board	

10.G Technical experience in ground water...

#	Comment	
No #	Masters in Environmental Policy & Mgmt.	
27	Risk Assessor USAF	
67	Professor of Geology & Geological Engineering, locate and supervise drilling wells in MVCC, monitor GWT	
72	Degreed and practicing hydro-geologist with CO Geological Survey	
103	Field geologist	
125	Consultant in geo-hydrology	
194	Own water rights & delivery systems + 5 wells	
259	Geologist for Colorado Division of Water Resources	
274	Professional engineer in water resources	
285	Retired hydrologist – hydro-geologist	
359	Professional geologist	
384	Geologist	
392	Geophysicist	
445	Geologist	
450	Groundwater geologist/hydrologist with USGS 26 years	
503	13 years in the Colorado Div. Of Water Resources	
557	40+ years working in GW field	
558	Worked in water for 25 years	
615	USGS Water Resources Division	
625	Water resource engineer	
724	Hydrologist	
727	Civil engineer – water resources	
971	Took some schooling in environmental science	

10.H Educator/Leader

#	Comment	
38	Retired professor	
67	Retired professor, Colorado School of Mines	
138	Elementary Ed.	
220	My husband was a teacher, he is deceased.	
297	Retired high school teacher	
377	Elementary school teacher	
406	38 years teaching in Denver, retired 1986	
456	Tod is a Sociology professor who teaches <u>Society & The Environment</u>	
505	Non-formal EPA	
510	Elementary teacher	
558	Worked in water for 25 years	
623	Retired H.S. Special Ed. Teacher	
635	Former	
724	Home school	
926	Plumbing instructor, teaching water supply and drainage	

10.1 Other

#	Comment
56	Own one acre of land and thinking about building a home in Park County
112	Retired
147	Paramedic
155	Environmentalists
194	Engineer / land developer
220	Housewife, semi employed, semi retired
309	Homeowner association environmental rep.
340	Retired
374	Have taken many classes, we had to establish a water district and do an augmentation and research water rights. We adjudicated our well in 1972.
379	Built my own home – I was general contractor for house & leach field & well.
402	Plain mountain folks, who do the best to protect the beauty around us.
452	Author/educator
453	Retired
456	Lyn is a former freelance editor who would gladly help make the booklet more readable (gratis).
497	Work for public utility company
708	Community volunteer activist
802	Retired
869	Live in plains
957	Housewife
970	Retired mech.
972	I am a floral designer in Evergreen. We have lived here in Indian Hills for 24 years!

Answers from Back Cover

#	Comment
27	I would like to see a discussion of the limited carry capacity of the Front Range.
38	Very informative booklet. Need more such info.
58	I like the graphics.
67	An attractive booklet. Have made comments on previous pages. Need better description of seasonal up and down movement of water table and climatic cycles, of wet to dry years and influence on shallow wells. Why does my well go dry and what can I do about it? Well draw-down by pumping – lowering of GWT. Need better description of recharge to the system. Many of the questions are repetitive to the text. Sidebar should directly emphasize the homeowner's interest. Many sidebars are too long – e.g. the case history (Aspen Park) – in "Is it safe to drink?" (This is hardly applicable to the concerns of the individual homeowner.) The septic tank contamination is the primary concern.
72	The center "Water Cycle" schematic is useful as a conceptual model, but its placement breaks up the section, "Is the view worth the price?" This distracts the reader, thinking the section doesn't continue.
74	The book was informative and timely. Most everyone I've discussed the "low flow" issues with, disagrees with them. People with thick hair (usually women) end up taking longer showers with low-flow nozzles because it takes longer to get the hair wet and then rinsed. Low flow toilets end

	up being flushed twice, numerous times because the waste isn't all gone with the 1 st flush. Overall – good job!
112	Figure out some way to get copies to everyone who is thinking of moving into the mountains.
125	Could delete word “fresh” from definition of groundwater – groundwater can be salty. Very good publication for general public – you have done a good job.
147	Very informative package. Have told many of my friends in the area about what I've learned from reading this package. Would be nice if every resident of Jeffco got a packet...I believe a lot of people are ignorant to a lot of the issues addressed in the pamphlet. Is an important issue, not just because we are in a drought...very well written...simplified advanced topics >>easy to read...fun pictures. Thank you.
155	<p>When answering the questions in #1, keep in mind that I already have a good background in water issues. Looking at it from the standpoint of distribution to people new to the area, I feel that it would be very useful. I found the book rather redundant, but that might not be such a bad thing. All of the Q & A section was covered elsewhere and could be eliminated, or in the front list the questions and indicate the page # where the question is answered.</p> <p>As indicated in #2, there needs to be a section similar to the water tips on p. 7. Also, add costs for testing and maintenance (rough idea) as on p. 13 in “cost between” \$10,000 and 25,000.</p> <p>Overall I find the book very well done and interesting. Every Planning and Zoning Dept. that deals with mountain property should be able to give permit applicants a copy. Special districts and homeowners associations in mountain communities should also have copies to distribute to newcomers. Thank you for a job well done! I will pass my copy around.</p>
176	Distribute this booklet via homeowners associations and realtors, Consider Evergreen Chamber of Commerce. Very informative – Good job
220	I would like to have the site size for individual well and septic be at least 5 acres and exemptions for old plats done away with. Old plats should use combining lots so the minimum is 5 acres or more.
259	You should be commended for a great publication.
274	<p>I am not sure of the basis for the statement on page 9 regarding the note for the permit applicant, which states, “At times confusing...” This is the address and contact information for us to communicate with the applicant. It is not intended to reflect the address of the well since this information is on the permit application. Also, the change in ownership is only required for registered or permitted wells and not for unpermitted and unregistered wells.</p> <p>I was unable to find the link on your web page for “Individual Water Wells – a Guide to Proper Construction” as stated in the Well Drilling Tips on page 9. I would make sure there is a link and reference to the Colorado Board of Examiners rules and regulations, the rules required by state law for well construction.</p> <p>On page 18 under the first question, it would seem to me that the first sentence should read, “If the system serves less than 15 homes, or is <u>not</u> defined...” (Emphasis added)</p>
281	Discourage our new neighbor who wants a 6,000 sq. ft. home, a swimming pool and a bed & breakfast on a small acreage.
285	The dedication to Elwood Bell is good, he was quite the man. This publication should help mountain dwellers and potential dwellers. A water source should be in place before building is conducted.
297	A great book! Very informative book!
300	We have moved to Littleton and no longer have well and septic.
308	Very good information especially for those who are not used to living with well and septic. Easy to understand. Like the visuals.
309	Especially during this time of drought people should be aware of the topics. Legislators should also be addressing these problems. Realtors should be required to give potential buyers as much info as possible, on the problems related to living in the mountains, instead of just pushing the

	property. Ref p. 18 - Q & A ...What laws ensure well water quality? We need the local government to help homeowners to locate and eliminate sources of well pollution. (stuck with problem after purchase) It's a shame people did not have insight into these topics before they became real problems.
335	I would like to know more about the water table in the area.
340	Add "how to obtain well record" and what/how to save contaminants (paint, oil, etc.) for eventual drop off disposal.
359	Very good, contains much basic info.
374	There are a number of properties that have been sold as "horse property", when in fact only a <i>household use</i> well can be drilled and owners do not understand that they can not water their animals. This needs to be made very clear. Realtors selling property in the mountains should be made aware of this booklet. Because the water situation is very serious maybe the Real Estate Commission should require agents to take additional classes on this subject. This booklet is a great step in the right direction. As time goes on it may become very important to have yourself well adjudicated, mostly if you have a domestic well permit. Under definitions (#2) when it comes to water we want everyone to follow the law (pros & cons). We pump our septic every 2 years and have for the 32 years we have lived in our home. People need to do this on a regular basis. Size of septic should depend on number of people, family of 4 to family of 10. Old septic systems should be updated by the County Health Department, residents won't do it on their own.
384	The booklet was well laid out – good design, effective use of sidebars and pictures/schematics.
386	This is a <u>wonderful!!</u> Thank you!
392	Get the county to understand per new permits!
394	The booklet is a good resource for anyone living or building in the mountains. Most people are quite ignorant about water up here. I have been quite pro-active on my own water issues, so I know a lot of what was covered in the booklet. I will save it as a reference. I would certainly appreciate my neighbors being well informed too!
401	Well done
406	Keep up the good work, thanks to all involved on the project. Are presentations made at schools?
418	How in the name of heaven do we get the "city folks" to consider the limitations placed upon us mountain dwellers?
436	Good effort! Needed!!
445	I am very proud that I was able to participate in your survey. We are still recording rain and snow and will appreciate getting the readings that you have in our area; Aspen Park, Eagle Cliff Road. Thanks
446	Mountain residents are stubborn. People who need this info most will probably not read it. Have school science classes (jr. high) spend one day on this and kids will share interest with parents. Great booklet.
456	Cartoons are CUTE – but what the dog & (whoever) are saying needs to be in larger print. Breaking the text in to smaller sections, with more subheadings, would make it more readable. Bolding critical statements such as "However, a well permit is not a water right" (bottom p. 8) would be useful. Bolding words that are defined in "Definitions" (esp. possibly unfamiliar words like xeriscaping) might help. OVERALL – a GREAT way to teach us about a difficult and complex but <u>very, very</u> important issue. Thanks for the work you've put into this!
457	Would be a good resource material for school children.
495	This is a very long-to-read, informative booklet.
497	The graphics are great. They take a complex issue and simplify it. The sections are not too long, i.e., readable length. Language is clear but not too elementary. Well Done. This booklet will help those already living in the mountains preserve and protect the resource, and those contemplating

	<p>moving to the mountains, a basis for asking questions.</p>
503	<p>Everyone in my office, who has reviewed the booklet, has praised it for both content and presentation.</p> <p>Re: Reader Response Survey</p> <p>Enclosed is the Reader Response Survey that was included with my copy of the Water Smarts Booklet you sent me.</p> <p>Since I was involved in the review and editorial process for some of the information presented in the booklet, since I don't rely on a well and ISDS, I'm not sure some of my responses are meaningful for the purposes of your survey.</p> <p>In any case, thanks for the opportunity to participate in the development of this document. I think it will be valuable tool for you and the citizens of Jefferson County who do rely on wells and ISDSs.</p>
505	<p>Great! Humorous/informative excellent, comprehensive for its purpose – non-technical. I love the dog!!</p>
511	<p>This is a really nice effort. It will be useful to those that take advantage of it.</p>
557	<p>Publication was written for public consumption and generally does not use over technical terms that the public would not understand. This is good.</p> <p>The publication has professional appearance and has good organization. About the right number of illustrations or figures. Illustrations were excellent.</p> <p>Unfortunately, the USGS report has not yet been printed with final conclusions, numbers and findings. More specific information from MGWRS would have been useful. The few numeric values that were listed may not be found in the final report.</p> <p>A more thorough review and some careful editorial changes could have reduced some misstatements in the publication – see examples or instances described in my letter.</p> <p>-----</p> <p>RE: Review Comments on Your Publication "Water Smarts"</p> <p>I have completed the enclosed Reader Response Survey, but wanted to expand and clarify a few of my comments. In general, it is probably a very useful document to provide some general information to mountain well owners. The text is clear and understandable for a layman. The illustrations are meaningful and excellent.</p> <p>Have commented in general, I would like to share the following comments as illustrative examples of how some further editorial work or peer review could have reduced some misstatements or cause future misunderstandings:</p> <ul style="list-style-type: none"> - Fractured rock aquifers such as the Turkey Creek Basin have a limited natural recharge. Well withdrawals and human consumption needs to be limited so as to not exceed that natural recharge or else the water supply for individual homes will dry up. - Many mountain well have very small yields – less than one gallon per minute. A yield of ¼ gallon per minute will provide sufficient water for a family of four with the appropriate storage. There are 1440 minutes in a day and this ¼ gpm would yield 360 gallons per day. - National drinking water standards (page 5) <u>do</u> apply for <u>all</u> human consumption, even domestic and household use only wells. The problem is that enforcement of water quality delivery to meet those standards only applies to public water supplies.

- The report should have stated that for the Turkey Creek basin that ground water quality testing did not show that the ground water quality exceeded any of the National (EPA) Drinking Water Standards.
- Ground water quality testing indicated that the quality was deteriorating with time, but the tests were inconclusive as to whether septic tanks and leach fields were responsible for that change.
- There is probably more danger to public health from ecoli bacteria than from nitrogen. Not all bacteria are bad.
- A well permit *is* a water right! Just because it is not decreed by the water court, only means it does not have the court assigned priority and adjudication date. In addition to the priority date, the date of adjudication is also needed to determine the seniority of a water right. Rights with an early priority date and recent adjudication date will still be junior rights.
- Well permits (page 9) were required for all nonexempt wells drilled after 1957 and for all exempt well by not later than 1965. I believe it was even earlier than 1965 and the statutes could be researched for that date. Only in 1972 with the passage of Senate Bill 35 and the accumulative affect of all wells in a subdivision was the State Engineer able to deny new small capacity exempt wells in over appropriated basins. Well permits were issued for some wells by the Colorado Water Conservation Board prior to 1957. Even today “exempt” wells drilled prior to May 8, 1972 can be late registered by the State Engineer. Late registration should be done soon!!
- For all parcels subdivided after 1972 where the stream is over appropriated, the type of well permit is “non exempt from administration” and must be included in an augmentation plan. This is a very common type of permit not even discussed on pages 9 & 10.
- The typical well diagram on page 11 shows perforated casing exists 100 feet above the pump. This is not covered in the Board of Examiners Rules. Such construction would often allow water to cascade into the well from high fractures and cause severe pump damage or failure. The pump is often set above the highest perforation to prevent this, if there is sufficient water in the well.
- The schematic (centerfold) is very useful, but the existence of “seasonal shallow subsurface flow” is a point of contention with Larry Cerrillo and I versus Mike Wireman and Kip Bossong. I don’t believe it is the major physical process taking water to the stream. This will be litigated by someone. The sketch does not show deep percolation from either septic leach field. Why not? Why does the Health Department require the 200 foot spacing and 5 acre lot sizes unless there is deep percolation of septic effluent back to the aquifer?
- Changes in permitted uses (page 14) seems to imply that a person applying to the State Engineer for the changes would have them granted. I doubt this unless the increased use was covered by an augmentation plan.
- Well permits (page 17) contain both a flow rate and annual volume limit.
- Water rights and even well permits can be obtained in areas with over appropriated streams (page 17). A court decreed water right can still be obtained for an over appropriated stream. It may only be in priority during flood flows and would be prevented from diverting during the rest of the time. Well permits will be issued, if an augmentation plan exists, for over appropriated streams.
- There may be a typo on the first column on page 18. I believe all defined public water

	<p>supplies require water quality tests. Do you mean to say “non public water supply”?</p> <p>I apologize for the lengthy set of examples, but they illustrate how additional peer review and editorial work could have caught and corrected some of the misstatements or clarified some of the points. Although I first scanned the publication and then read it completely, there might be additional corrections that should be made.</p>
566	<p>Our well was part of test project and we received a very detailed and technical report on our water quality, but a simpler explanation would have been appreciated as a <u>non-chemist</u> it was difficult to evaluate.</p>
580	<p>I <u>love</u> the dog</p>
600	<p>I think you should include the fact that medications should not be disposed of in the toilet when a septic system is used.</p> <p>I think your booklet “Water Smarts” is very informative and should be available to anyone buying in the mountains, where wells and septic systems are used. Perhaps realtors should have copies to pass out to prospective buyers.</p>
635	<p>Thank you very much for your Water Smarts booklet. The format of your survey makes it difficult for me to provide a useful response. So I’m writing you this quick note.</p> <ul style="list-style-type: none"> - <u>The Jeffco Mountain Groundwater Resource Study was great.</u> - <u>It may be the most important thing that the county has ever done.</u> - <u>The Water Smarts book is a truly great idea.</u> <p>It has quality information and illustrations. Unfortunately it’s difficult to put this sort of information into any format that works for normal readers. This piece reads like it was written BY geologists, engineers, and Sierra clubbers FOR geologists, engineers, and Sierra clubbers.</p> <p>I’m a certified groundwater nut. So I read the whole thing. The content and illustrations are great. The length and writing style are oppressive. A normal reader might quickly glance at a 1 or 2 page well illustrated flyer and be hooked into reading it by some catchy lead lines or illustrations. This piece was written to please water nuts like me...who really don’t need to read it.</p> <p>Also, you devote only a single paragraph to what people can do to conserve. Your piece should have 2 focal points. 1st, QUICKLY describe the problem. 2nd, show people some easy ways that they can take action to conserve. We are all creatures of habit. <u>The best that can hope to do in a flyer or booklet is to get people to make a very few easy changes to their habit patterns.</u> Most people are too busy watering their lawn or filling their jacuzzi to take the time to read a tome that is this long.</p> <p><u>Thanks again for your efforts so far. You are moving in the right direction. The work that you are doing will have a very real impact on our future.</u></p>
708	<p>The booklet is good but, I’d like to see more understanding of water concerns by Planning Commission and County Commissioners as they continue to OK development.</p>
727	<p>Recommendations/advice should be bolded e.g. page 7 under “Testing the Waters” bold “In most cases, all private wells should be tested annually for bacteria and nitrates.” Also, tell how to <u>get</u> the test done.</p>
800	<p>It’s a great start. You might include more water saving tips. Also, what to look out for and how to correct a dry well situation. Include some scary data on cost and numbers and numbers of wells drying up – as our area has many.</p>
805	<p>Good job – If I have more comments I’ll let you know.</p>
807	<p>I found it informative & well written.</p>
808	<p>Great booklet with lots of info!</p>
818	<p>Thank you – this is very helpful in understanding water issues.</p>
819	<p>Excellent publication – should be required reading in high schools and receive widest distribution</p>

	possible. How about a video/tv program of same info with respected experts as talking heads.
821	The booklet hedges on the availability of groundwater for water wells. See bottom of page 12 where it mentions "recent studies". The county has known for a long time that the consumption of groundwater exceeds the replacement. The static level of water where I live continues to drop and replacement wells are being drilled to a depth of 1,000 feet and more. Bear Mountain Vista sits atop a fractured rock formation where the absorption of new water in the fracture takes place very slowly and cannot keep pace with mountain development. It is imperative that the county limit the size of new lots so that new homes are not being built where there will be an inadequate water supply. If a great number of wells go dry, the county will have to deal with that issue to the extreme displeasure of residents. You must manage growth!
890	<ol style="list-style-type: none"> 1. Did I read right in the "centerfold"? Evapo/trans was 75% to 97% in 2 consecutive years? These results = the hypothesis 2. Could we extrap a capacity model based on evapo/trans? It would be a working hypothesis at first.
894	Good practical advice – that a 'layman' can understand. The best thing about this booklet is that it tells the consumer to "Ask questions before you buy!" with specific questions to ask.
926	Booklet extremely well done. A "must read" for potential homeowners building in the mountains.
957	I would like to have had the question, "How much water do I have in my well?" addressed. Is there any way to judge if your well is maintaining an adequate level, or is it running low in this drought?
966	I felt this information should have been provided years ago and as past President of a HOA, would have appreciated the info and education. New inexperienced mountain people do not realize that water is still a rare commodity even though you have a well, it does not mean you are at liberty to use/waste more water. A lot of new people up here think that.
972	If is a very well done publication, from the color pictures and graphics to the "plain English" explanations of things! There were a few things I've learned and I have been here for a "few" years. Thank you for a great job! Kudos to all!