An Inventory of Private Water Wells in the Fisher River (05SD) Watershed

Prepared by:

East Interlake Conservation District

December 2010

Gimli, Manitoba

i. Abstract

Water wells are a primary source of drinking water for many residents in the Canadian Prairies. Understanding our ground water supply allows us to foresee water quality problems as they arise and take a proactive approach to developing methods to maintain the reliability of water well environments. This is fundamental to sustainable development and the maintenance and improvements to the quality of life for rural communities.

A well inventory program was conducted by the East Interlake Conservation District for the Fisher River (05SD) watershed from May 4th to August 18th of 2009. Water samples were collected from 234 active water wells to test for nitrate and bacteria concentrations. Additional well information such as well depth, size and type was collected in conjunction with the water samples to update the Province of Manitoba's provincial well records. Results of this comprehensive well survey are that 87 of the 234 wells (37.18%) failed to meet basic Canadian Drinking Water Quality Guidelines.

Public participation in this project was fair. Positive public participation may be attributed to increased public awareness of potential health problems associated with poor water quality. These issues received quite a bit of publicity this year due to large amounts of rainfall during the spring and summer. There was quite a bit of overland flooding, and people were concerned about how this would affect their water quality.

Information obtained in this survey will be used to aid in the development of an Integrated Watershed Management Plan within the Fisher River (05SD) watershed. It is recommended that this type of program continue through future partnerships with Manitoba Water Stewardship – Groundwater and Office of Drinking Water sections; and the East Interlake Conservation District.

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I. INTRODUCTION

In August 2005, the East Interlake Conservation District (EICD) became the seventeenth conservation district in Manitoba. It was formed with the collaboration of the Province of Manitoba, and the Federal Government, and surrounding Rural Municipalities. The purpose of the EICD is to address soil and water management issues using a cooperative, long-term, planned approach within defined watersheds. To better understand the watershed and ground water quality, a well water sampling program was implemented in 2006. In May to August of 2010, the program focused on the Fisher River watershed (05SD).

The Fisher River watershed is one of the four watersheds within the EICD boundaries. It is located along the west side of Lake Winnipeg. Residences targeted were within or near the boundaries of the watershed. This included homes within the rural municipality of Fisher. A portion of the R.M. of Bifrost is also located within this watershed, but there were no homes to sample in this region. The location of the 05SD Watershed is shown in Figure 1.

The Government of Manitoba, namely the Groundwater Management Section and the Office of Drinking Water of Manitoba Water Stewardship, assisted the EICD throughout the project. A total of 234 private wells were sampled for nutrients and bacteria (nitrates, total coliform and E. coli); the most common health parameters affecting private well water quality. All samples were analyzed by ALS Laboratory Group in Winnipeg, Manitoba. The well samples were also analyzed for conductivity and temperature via *in-situ* water analyses. Information about each well was collected from the well owner and recorded through the use of a standardized questionnaire. To obtain more accurate information, a query was then executed for each well by using Groundwater Drill Logs (GWDrill) provided by Manitoba Conservation.

The cooperative partnership between Manitoba Water Stewardship and the EICD was developed as a means to engage the public through the education of well owners in preventative and corrective measures for well maintenance, to provide a service to landowners by giving them free access to bacteria and nitrate analyses for their well, and to develop public awareness on how residents can participate with the EICD and governmental agencies to secure their water quality and quantity.

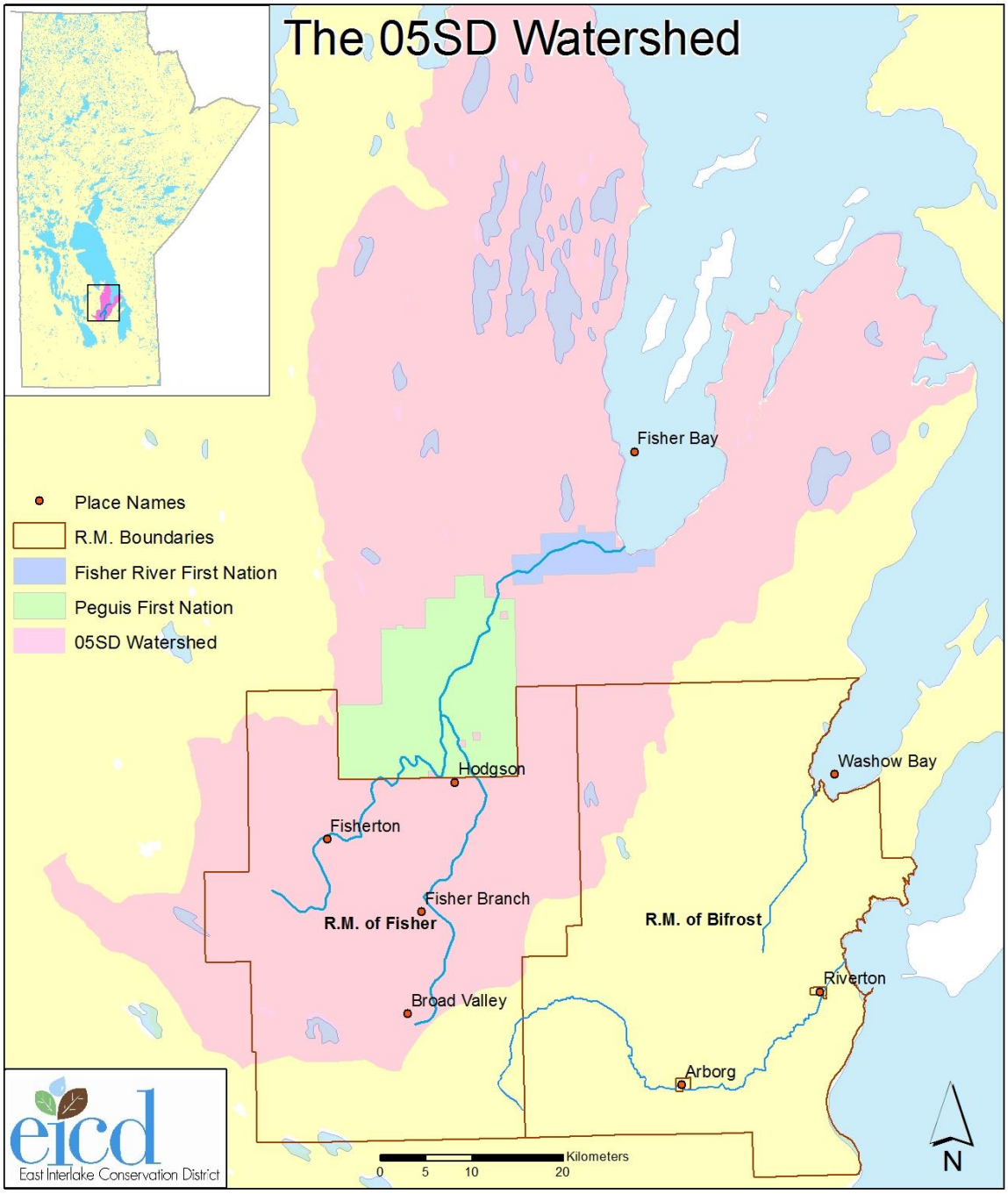

Figure 1. Location of the 05SD Watershed

For Manitoba Water Stewardship and the EICD, this program acts to: identify "hot spots" of well water contamination within the 05SD watershed, collect data on the number and location of private water wells in the 05SD watershed, improve and supplement the Province of Manitoba's water well database, and provide a benchmark of groundwater data from which to gauge any watershed changes. This information can ultimately be used to assist in program development and watershed management planning. Successful implementation of this program and the use of the resulting data can potentially identify any activities or conditions which may lead to bacterial and/or nitrate contamination of private water wells and possibly prevent contamination of the groundwater aquifer.

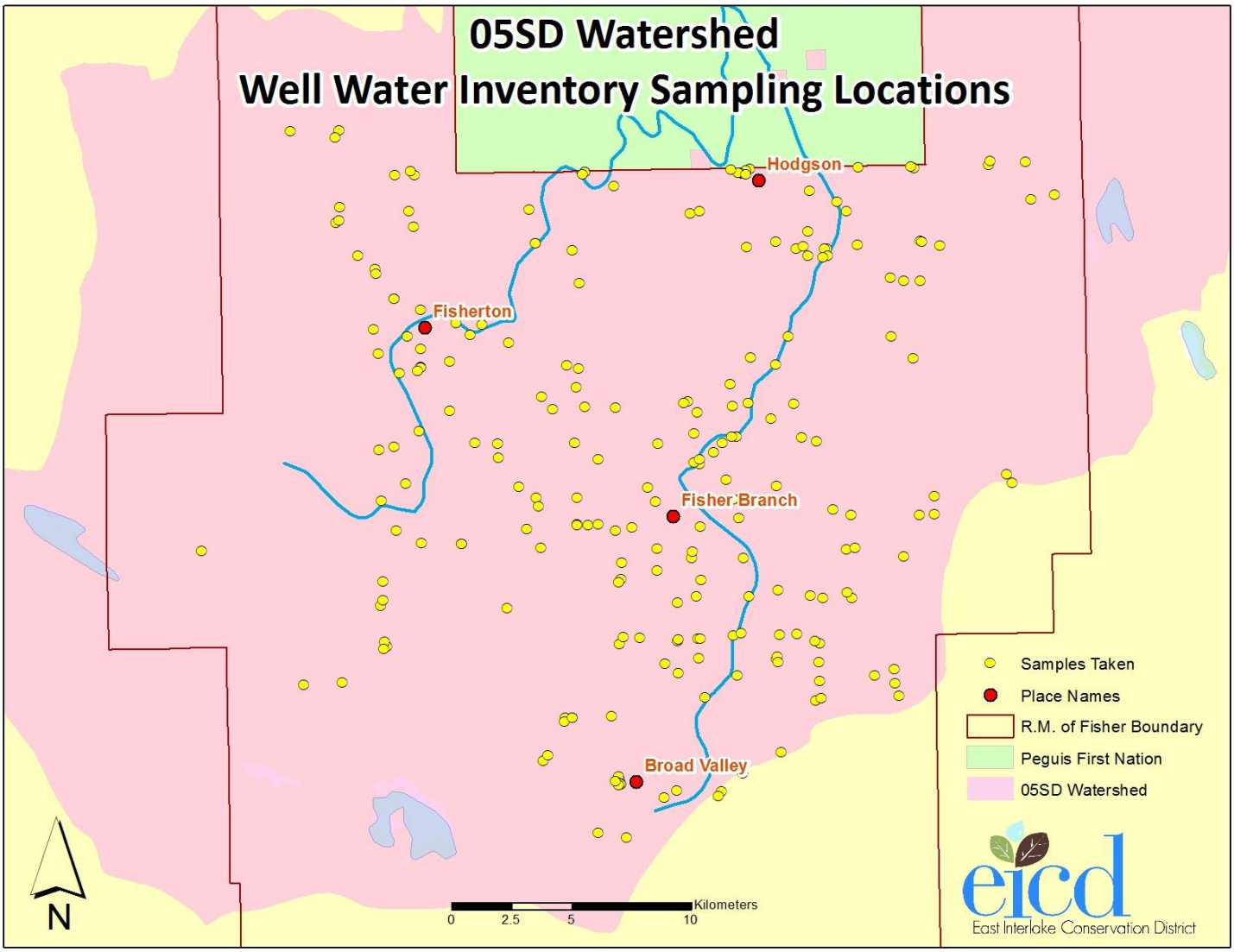

Figure 2. 05SB Watershed Well Water Inventory Sampling Locations

II. METHODOLOGY

A. Sampling

Well water sampling locations were confined to the 05SD watershed and closely surrounding area. The goal of the project was to capture a representative assessment of the groundwater quality throughout the watershed. Sample locations throughout the area were selected based on landowner availability and with a goal of obtaining approximately two samples for every four square miles. This was difficult to accomplish, due to many regions being very sparsely populated. Samples were collected from active wells on private property only. Participation by the well owner was voluntary and confidential. The locations of the sampled wells within the watershed are shown in Figure 1.

Well water samples were collected from taps which would provide the most representative sample from the well. Therefore, water treatment devices (i.e. filtration systems or softeners) were bypassed and any devices directly attached to taps (i.e. aerators) were removed. All taps were opened fully and allowed to run for approximately five minutes prior to sampling. This allowed standing water to be removed from household pipes and holding tanks.

During the well water sampling process, efforts were made to avoid contamination. Before sampling, the tap was cleaned with disinfecting wipes and a diluted solution of bleach and water to remove any standing bacteria. Water samples were then collected in sterile containers provided by ALS Laboratory Group and labeled using waterproof ink with the sample identification number, the name of the well owner and the sampling date. The sample containers were filled to the line indicated on the container. The conductivity and temperature was recorded by using a calibrated portable water quality meter[1]. Samples were immediately stored in a chilled cooler and submitted to the laboratory for analysis within a period of 24 hours. At the lab, the samples were analyzed for nitrogen, total coliform and e.coli.

B. Questionnaire

Information about the well owner, the property, the construction of the well, and the history of the well was requested from the well owner at the time of sampling and recorded on a standardized questionnaire. The purpose for the questionnaire was to allow for analysis of potential relationships between water quality data, well depth and well type. The information

[1] Hatch Model 51800 Conductivity Meter

provided by the well owner was based on their current knowledge of their water well. This information was collected to allow Water Stewardship to update provincial records and to collect information that may indicate potential reasons for water well contamination.

EICD staff Eric Roberts filling out questionnaire

C. Sample Shipping and Chain of Custody

Prior to submitting well water sample containers to the laboratory, a chain of custody (CoC) form was used to create an accurate and verifiable record which would be used to trace the possession and handling of well water samples from the moment of collection until receipt by the laboratory. A CoC form was required for all water samples collected during the well water inventory. The form included the name of the sample collector, the time the sample was collected, the mailing and physical address of the well owner, the sample matrix, and the type of analysis requested. The CoC was signed and dated by the person shipping the sample containers and packed with the corresponding samples. Prior to shipping the samples, the questionnaire information was compared to respective sample containers to ensure the accuracy

of the legal land location, the sample identification number, and the correct spelling of the name of the well owner.

Once all sample containers were properly packaged in the cooler, ice or ice packs were added to the cooler to keep the samples at a temperature of approximately 4°C. The cooler was then sealed securely with tape to prevent the lid from opening. Samples were shipped via bus to Winnipeg and received the following day by ALS Laboratory Group–all within 24 hours of the well sample.

D. Results

As per the Drinking Water Safety Act, ALS Laboratories immediately contacted the homeowner if their results were found to not meet Canadian Drinking Water Guidelines. The EICD also fielded calls from concerned homeowners as to what steps should be taken to remedy the situation. The EICD offered to help residents resample wells when they had failed bacteria guidelines. Re-sampling was often done approximately 2 weeks after the homeowner had disinfected their wells. Some homeowners hoped that the result was an anomaly and asked that their well be re-sampled without any disinfection taking place.

If no contamination was present in the well water sample, the well owner would receive the results either via e-mail or post. The EICD received all results from ALS laboratories via e-mail. All data was compiled in a Microsoft Office Access database which was shared with Water Stewardship.

ii. TEST RESULTS

Of the 234 wells that were sampled for bacteria and nitrate levels, 37.2% (87) of the well water samples failed the Canadian Drinking Water Guidelines (CDWG) for bacteria and/or nitrate. A summary of results is shown in Figure 3.

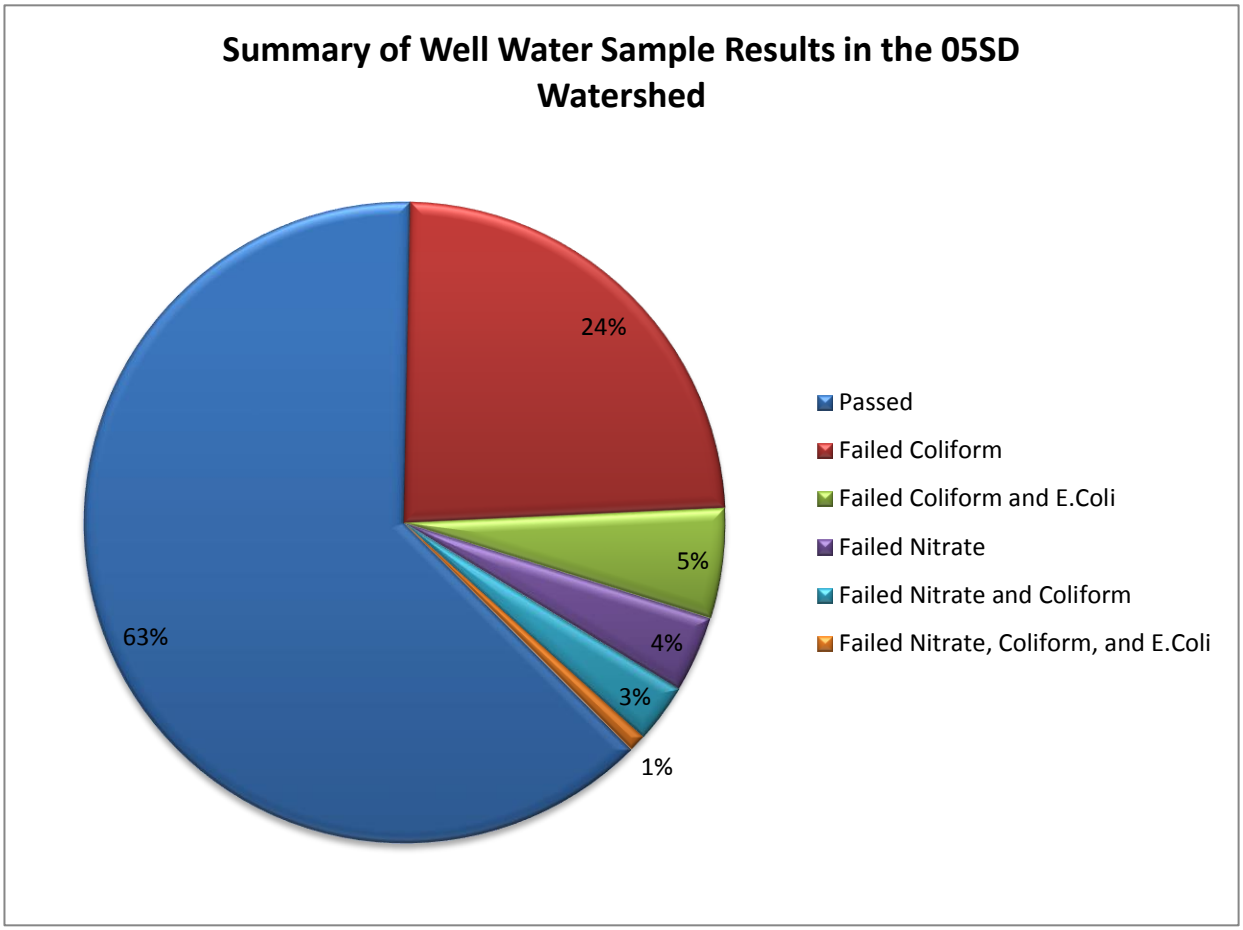

Figure 3: Summary of Well Water Samples in the 05SD Watershed

Of the 37.2% (87) of the wells that failed, 64.4% (56) failed due to total coliform counts, 14.9% (13) failed for both *E. coli* and total coliform, 10.3% (9) failed nitrate, 8% (7) failed nitrate coliform, and 2.3% (2) failed all three parameters (coliform, E.coli, and nitrate). The reasons for well test failures are shown in Figure 4.

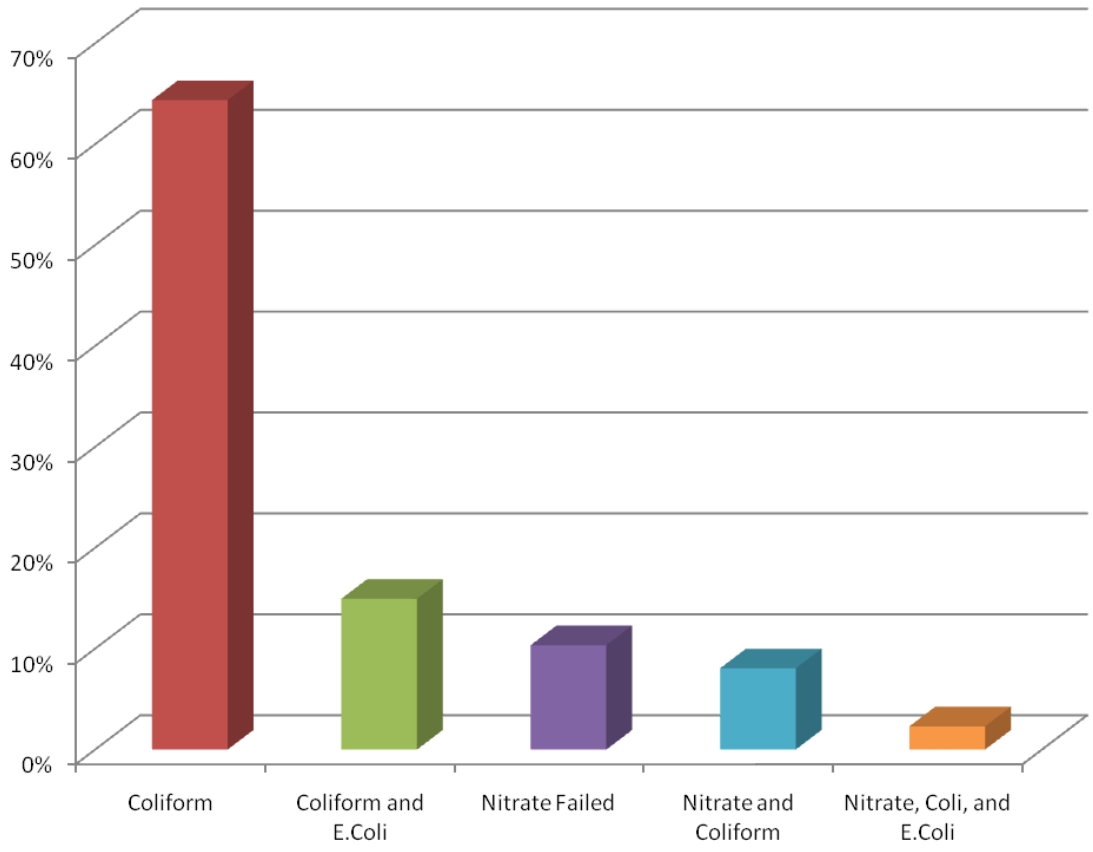

Figure 4: Reasons for Well Water Test Failures in the 05SD Watershed

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iii. CONCLUSION

Prior to implementation of this program, detailed information regarding the health of the aquifer directly under watershed Fisher River was not available. A key finding as a result of this program was that 37.2% of rural water wells failed to meet basic Canadian Drinking Water Quality guidelines in this watershed. High rainfall and excess moisture in the area in 2010 could have contributed to the nearly 1 in 3 failure rate. Hopefully increased programming targeted at rural audiences regarding proper maintenance and well installation can decrease this statistic even further. This program acted as an initial education campaign and hopefully raised the public's awareness of drinking water quality in watershed 05SD.

The data gathered through the partnership between the EICD and Water Stewardship will be crucial to the successful development of a watershed management plan for the region. It is recommended that a continued partnership exist to retest in the future to see drinking water quality improvements have been made.

iv. REFERENCES

Betcher, Robert. “Washow Bay/Icelandic River Watersheds State of the Watersheds Report – Groundwater.” Report provided to the East Interlake Conservation District, April 2, 2007.

Oakton Con11 Series

Health Canada. “Guidelines for Canadian Drinking Water Quality – Summary Table.” Health Canada website. http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guide-res_recom/index_e.html.

Manitoba Intergovernmental Affairs. Water Facts – Farm Water Analysis. (Brandon, MB: Manitoba Water Services Board, 2000).

APPENDIX A: WELL SITE ASSESSMENT FORM

East Interlake Conservation District

2009 Well Inventory Program

1. Well Owner - Contact

Name _____

Address _____

Town _____ MB Postal code ___ ___

Telephone 204 - ___ - ____

Legal Description

1/4 Sctn Twp Rge

___ - ___ - ___ - ___ W / E

RM _____

2. Well ID Information

Number of Wells On-site ____

Well Name _____ Well Location _____

Well PID _____ GPS Co-ordinates

Pictures Taken Yes ☐ No ☐

UTM NAD 83 Zone 14N E _____ N _____

3. Well Use Information

Well use Currently used ☐ Seasonal ☐ Inactive ☐ Abandoned ☐ Sealed ☐ Other _____

If an adandoned well, is the owner interested in the CD sealing the well: Yes ☐ No ☐ Unknown ☐

Water use Domestic ☐ Drinking water ☐ Livestock ☐ Heat/AC ☐ Other _____

Treatment Softener ☐ Chlorinator ☐ Filter ☐ R.O. ☐ U.V. ☐ Other _____

4. Well Sampling Information

Sampled Yes ☐ No ☐ Sample Date Month ___ Day ___ Year ____

Sampling Location _____ Temp. _____ °C

Sample ID SRRCD08-___ Cond. _____ uS/cm

Parameter	Lab	Lab Number	Lab Results	Owner Notified
Nitrate ☐	Cantest		NO_3-N _____ mg/L	Yes ☐ No ☐
Bacteria ☐	ALS		TC ____ EC ____ MPN/100mL	Yes ☐ No ☐

Sampling Comments _____

5. Well Construction Details

GWDrill Well Log Yes ☐ No ☐ Orig. Well Owner _____

Year Completed _____ Contractor _____ Total Depth _____ ft / m

Method Drilled ☐ Bored ☐ Dug ☐ S/point ☐

Casing Material Galv. ☐ Steel ☐ PVC ☐ Fiberglass ☐ other _____ Casing Depth ____ ft / m Casing Dia. ____ in

Well Screen Open Hole ☐ SS ☐ PVC ☐ Fiberglass ☐ other _____

Well Cap or Seal Yes ☐ No ☐ Type _____ Condition _____

Well Pit Yes ☐ No ☐ Depth _____ ft / m Dia. ____ in Stick-up ____ in

Construction Material Corr. Steel ☐ Concrete ☐ Wood ☐ other _____

Lid or Seal Yes ☐ No ☐ Type _____ Condition _____

6. Well Head Conditions

Casing Stick-up _____ in **Other** (i.e., buried) _____

1. Is there a old cribbing inside or outside of a newer cribbing..... Yes ☐ No ☐ Unknown ☐
2. If there is a well pit, is there evidence of water leaking into the pit..... Yes ☐ No ☐ Unknown ☐
3. Is sufficient stick-up available so water doesn't drain into the well..... Yes ☐ No ☐ Unknown ☐
4. Is any water currently ponded around the well..... Yes ☐ No ☐ Unknown ☐
5. Is there any unsealed annular space visual at ground surface..... Yes ☐ No ☐ Unknown ☐
6. Is the ground surface graded so water drains away from the well.... Yes ☐ No ☐ Unknown ☐
7. Is the service connection contained in a pit ..... Yes ☐ No ☐ Unknown ☐
8. Are there any nearby sources of contamination..... Yes ☐ No ☐ Unknown ☐

If yes, identify source and location _____

Comments

_____

Well Details/Location Information - If applicable, show well details or location information

Well Inspector _____ **Date** _____

Revision Date: 2008 May

APPENDIX B: CHAIN OF CUSTODY BACTERIA

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES
Environmental Division

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # _____

Page ____ of ____

Report to:	**Report Format / Distribution**	**Service Requested:**
Company:	☑ Standard ☐ Other	☑ Regular Service (Default)
Contact:	☑ PDF ☑ Excel ☐ Fax	☐ Rush Service (2-3 Days)
Address:	Email 1: abelanger.eicd@mts.net	☐ Priority Service (1 Day or ASAP)
	Email 2:	☐ Emergency Service (<1 Day / Wkend) - Contact ALS
Phone: Fax:		**Analysis Request**
Invoice To: ☑ Same as Report	Indicate Bottles: Filtered / Preserved (F/P) →→	P P
Company: MB Water Stewardship - Office of Drinking Water	**Client / Project Information:**	
Contact: Don Rocan	Job #: EASTINTERLAKE2008	
Address: 200 Saulteaux Cres.	PO/AFE:	
Sample	Legal Site Description:	
Phone: (204) 945-7420 Fax: (204) 945-7419	Quote #:	
Lab Work Order # (lab use only)	**ALS Contact:** / **Sampler** (Initials):	

Sample #	**Sample Identification** (This description will appear on the report)	**Date** dd-mmm-yy	**Time** hh:mm	**Sample Type** (Select from drop-down list)	Total Coliform	e. Coli									Hazardous?	Highly Contaminated?	Number of Containers

Guidelines / Regulations	**Special Instructions / Hazardous Details**

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.

Relinquished By:		Date & Time:		Received By:		Date & Time:		Sample Condition (lab use only)	
Relinquished By:		Date & Time:		Received By:		Date & Time:		Temperature	Samples Received in Good Condition? Y / N (if no provided details)

APPENDIX C: CHAIN OF CUSTODY NITRATES

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES
Environmental Division

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC #
Page ___ of ___

Report to:		**Report Format / Distribution**		**Service Requested:**
Company:		☑ Standard ☐ Other		☑ Regular Service (Default)
Contact:		☑ PDF ☑ Excel ☐ Fax		☐ Rush Service (2-3 Days)
Address:		Email 1:	abelanger.eicd@mts.net	☐ Priority Service (1 Day or ASAP)
		Email 2:		☐ Emergency Service (<1 Day / Wkend) - Contact AL
Phone:	Fax:			**Analysis Request**

Invoice To:	☐ Same as Report	Indicate Bottles: Filtered / Preserved (F/P) →→	
Company:	MB Water Stewardship - Groundwater Managament	**Client / Project Information:**	
Contact:	Bob Betcher	Job #:	EASTINTERLAKE 2008
Address:	200 Saulteaux Cres.	PO/AFE:	
Sample		Legal Site Description:	
Phone:	(204) 945-7420 Fax: (204) 945-7419	Quote #:	
Lab Work Order # (lab use only)		**ALS Contact:**	**Sampler** (Initials):

Sample #	**Sample Identification** (This description will appear on the report)	**Date** dd-mmm-yy	**Time** hh:mm	**Sample Type** (Select from drop-down list)	Nitrate Analysis										Hazardous?	Highly Contaminated?

Guidelines / Regulations	**Special Instructions / Hazardous Details**

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.

Relinquished By:		Date & Time:		Received By:		Date & Time:		Sample Condition (lab use only)	
Relinquished By:		Date & Time:		Received By:		Date & Time:		Temperature	Samples Received in Good Condition? Y / N (if no provided details)

APPENDIX D: HANDOUTS

East Interlake Conservation District
Box 1740 Gimli MB R0C 1B0
Ph.(204)642-7578 Fx.642-7581

While you were out, we stopped by to ask a few questions…

Groundwater, or water that flows underground in the spaces between rocks, soil or in crevices and cracks in rock, is the primary source of water supplies in the Interlake region of Manitoba. Groundwater is integral to the hydrologic system, and plays a vital role in the functioning of ecosystems and biological habitat. Maintaining groundwater quality is directly linked to the health and prosperity of our communities. Risks to groundwater quality in the Interlake region of Manitoba include leaks and spills from industry, agriculture and lagoons, seepage from septic systems in sensitive groundwater recharge areas and bacterial contamination from improperly constructed wells or unsealed abandoned wells.

An old-fashioned hand-pump and well located south of Fraserwood, prior to sealing by the EICD.

The East Interlake Conservation District (EICD), formed as a partnership between 14 member municipalities, communities and the Province of Manitoba. It is committed to developing relevant programs for residents of the Interlake. Two programs developed as part of our groundwater protection program include: abandoned well sealing (applications available at our Gimli office), and a well inventory, described below.

The EICD is collecting information about the location and condition of wells to better understand risks to the source of our drinking water. EICD representatives will be knocking on doors and asking watershed residents to volunteer information about the status of their wells currently in use. EICD representatives will record information about the age, use and condition of the well, as well as collect a water sample which will be analyzed for water quality parameters such as conductivity, turbidity and bacteria. The EICD will cover all testing costs. This program provides an opportunity for watershed residents to learn about the condition of their existing well, as well as help the EICD to create programs that meet the needs of watershed residents and develop a 'source water protection plan,' or a plan which outlines steps to ensure the source of our drinking water is safe for years to come.

Groundwater is integral to the health and vitality of our Interlake communities. We appreciate your help in protecting this valuable resource. **If you received this handout our representatives missed you while you were out. We invite you to call our office at 642-7578 to schedule a visit at a more convenient time.**

groundwater protection

eicd
East Interlake Conservation District
Ph:(204)642-7578 Fx:(204)642-7578 www.eicd.ca

Manitoba

Working Today For a Healthy Tomorrow

An old-fashioned hand-pump and well located south of Fraserwood, prior to sealing by the EICD.

Groundwater, or water that flows underground in the spaces between rocks, soil or in crevices and cracks in rock, is the primary source of water supplies in the Interlake region of Manitoba. Groundwater is integral to the hydrologic system, and plays a vital role in the functioning of ecosystems and biological habitat. Maintaining groundwater quality is directly linked to the health and prosperity of our communities. Risks to groundwater quality in the Interlake region of Manitoba include leaks and spills from industry, agriculture and lagoons, seepage from septic systems in sensitive groundwater recharge areas and bacterial contamination from improperly constructed wells or unsealed abandoned wells.

The East Interlake Conservation District (EICD) formed as a partnership between 15 member municipalities, communities and the Province of Manitoba. It is committed to developing relevant programs for residents of the Interlake. Two programs developed as part of our groundwater protection program include: abandoned well sealing (applications available at our Gimli office or www.eicd.ca), and a well inventory, described below.

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Groundwater is integral to the health and vitality of our Interlake communities. We appreciate your help in protecting this valuable resource. Please contact the EICD office at 642-7578 with any questions or feel free to visit us at our office in Gimli, located at the corner of Highway 9 and Colville Rd.

groundwater protection

East Interlake Conservation District
Ph.(204)642-7578 Fx.(204)642-7578 www.eicd.ca

Manitoba

What happens to your samples?

- Samples will be sent to ALS laboratories in Winnipeg, MB
- They will then be tested for nitrate and 2 types of bacteria (total Coliform and *E. coli*)
- Results will be sent to you, Manitoba Water Stewardship and the EICD
- As per the Drinking Water Safety Act, ALS Laboratories will contact you if the results are deemed 'high'

What do your results mean?

- Nitrates: Nitrate (NO3) is a compound of nitrogen and oxygen found in many food items in your everyday diet.
    - Although low levels of nitrates may occur naturally in water, sometimes higher levels can be found and are potentially dangerous to infants. High nitrate levels in drinking water pose a risk to infants because they may cause methemoglobinemia, a condition known as "blue baby."
    - Elevated nitrate levels are often associated with poorly constructed or improperly located wells.
- Coliform bacteria: are the commonly-used bacterial indicator of sanitary quality of foods and water. Coliforms are abundant in the feces of warm-blooded animals, but can also be found in the aquatic environment, in soil and on vegetation. In most instances, coliforms themselves are not the cause of sickness, but they are easy to culture and their presence is used to indicate that other pathogenic organisms of fecal origin may be present.
    - If only total coliform bacteria are detected in drinking water, the source is probably environmental. Fecal contamination is not likely. However, if environmental contamination can enter the system, there may also be a way for pathogens to enter the system. Therefore, it is important to find the source and resolve the problem.
    - *E. coli* is a sub-group of the fecal coliform group. Most *E. coli* bacteria are harmless and are found in great quantities in the intestines of people and warm-blooded animals. Some strains, however, can cause illness. The presence of *E. coli* in a drinking water sample almost always indicates recent fecal contamination – meaning there is a greater risk that pathogens are present.

Test Parameters	Manitoba drinking water quality standards
Total coliform	<1 per 100ml
Escherichia. coli	<1 per 100ml
Nitrate+Nitrite N	10 mg/L

APPENDIX E: WELL INVENTORY TEST RESULTS

Sample_ID	Temp (°C)	Conductivity (uS)	Nitrates	Total_ Coliform	E_Coli
649	8	542	0.0084	4	0
823	6.4	855	0.005	0	0
727	7.3	660	0.0113	0	0
881	8	653	0.907	0	0
822	7.4	723	0.0146	0	0
707	7.8	700	0.0099	0	0
616	5.4	896	0.005	0	0
795	7	743	0.0077	0	0
786	10	670	0.0098	0	0
606	7	699	0.028	0	0
583	9.7	822	0.005	0	0
683	8.8	975	0.046	0	0
608	7.5	706	0.005	0	0
846	6	555	0.017	0	0
847	6.8	520	0.019	0	0
715	8.1	801	0.011	0	0
653	7.4	476	0.0054	0	0
817	5.9	695	0.005	0	0
720	6.6	753	0.233	0	0
819	7.1	688	0.0056	0	0
820	7.9	750	0.0106	0	0
779	6.5	721	0.023	0	0
890	8	650	1.85	0	0
861	7.9	695	0.809	0	0
658	7.4	650	0.0055	0	0
696	6.7	682	0.109	0	0
698	8.8	849	0.0069	0	0
815	5.8	540	0.013	0	0
718	7.9	807	0.278	0	0
686	8.5	850	0.039	0	0
581	10.8	691	0.007	0	0
611	6.3	680	0.008	0	0
780	5.9	703	0.012	0	0
765	6	694	0.005	3	0
593	10.4	792	0.014	0	0
778	5.9	713	0.011	0	0
794	6.7	743	0.0127	0	0
856	7.8	553	0.0083	3	1
702	7.4	599	0.0139	0	0
771	6.4	780	0.005	0	0
844	6.9	725	0.014	0	0
892	8	688	0.307	0	0
748	7	650	0.005	0	0
580	8	750	0.006	0	0

615	4.3	715	0.005	0	0
734	7	750	0.011	0	0
610	8	580	0.014	0	0
694	7.8	649	0.006	0	0
716	8.7	788	0.428	200	200
684	8	779	0.01	0	0
796	6.8	714	0.005	0	0
642	8.4	519	0.0077	0	0
559	7.6	561	0.005	0	0
634	8	600	0.016	0	0
802	6.9	843	0.506	0	0
886	7.6	705	1.92	200	0
569	10.2	648	0.099	0	0
806	7.4	747	0.015	0	0
787	9.2	714	1.96	0	0
923	8	784	0.0339	0	0
754	6.2	623	0.015	0	0
840	7.6	764	0.0096	0	0
603	9.7	707	0.005	0	0
625	8.7	512	0.008	0	0
834	8.1	720	0.0066	0	0
785	8.9	666	0.0099	0	0
808	6.9	648	0.0097	0	0
692	8	710	0.005	0	0
666	5.5	572	0.0105	0	0
600	7.7	555	1.32	0	0
831	6	673	0.0076	0	0
586	9.7	1264	8.83	2	0
650	8.6	610	1.92	0	0
888	8.7	628	2.11	0	0
620	9.9	575	0.0071	0	0
726	8.1	676	0.0113	0	0
691	8.9	747	0.005	0	0
632	6.8	555	0.01	0	0
633	8.9	583	0.021	1	0
657	7.6	622	0.0095	0	0
587	7.6	877	0.021	0	0
644	7	604	0.005	0	0
711	8.4	741	0.0072	0	0
664	6.5	570	0.0165	0	0
567	9.6	1064	3.33	0	0
797	6.2	430	0.005	0	0
740	7.7	655	0.035	0	0
833	8.2	766	0.0076	0	0
730	6.8	712	0.0083	0	0
733	9.9	872	0.0053	0	0
591	7.6	760	0.013	0	0
746	7.5	639	0.01	0	0

811	6.2	599	0.005	0	0
744	6.8	734	0.005	95	0
835	6	754	0.0066	0	0
764	5.9	666	0.013	0	0
781	6.7	700	0.011	0	0
646	6.5	631	1.54	0	0
612	5.6	631	0.005	0	0
663	7.7	562	0.0065	0	0
693	6.2	630	0.005	0	0
674	7.4	784	0.204	0	0
579	5.5	720	0.005	200	0
793	6.1	740	0.0087	0	0
800	6.9	631	0.0077	0	0
570	9.6	600	0.072	0	0
571	8.4	780	0.005	0	0
573	7.6	701	0.008	0	0
655	9.4	454	0.005	0	0
667	7.3	537	0.0065	0	0
699	8	665	0.0099	0	0
775	6.4	583	0.015	0	0
839	7.4	651	0.0076	0	0
763	6.4	707	0.005	0	0
826	8.6	803	0.015	0	0
825	7.3	808	0.012	0	0
738	6.6	754	0.006	0	0
701	8.7	746	0.005	0	0
743	7	721	0.006	0	0
578	10.7	720	0.005	0	0
721	7.6	754	0.014	0	0
882	7.9	657	0.005	0	0
891	7.8	602	0.467	0	0
809	7.4	740	0.012	0	0
902	7.9	647	0.889	0	0
895	9	642	1.85	0	0
590	7.7	830	0.014	0	0
745	6.9	696	0.005	0	0
660	6	658	0.0095	0	0
858	7.3	649	0.005	0	0
728	7.7	654	0.0073	0	0
688	9.6	705	0.01	0	0
749	7	648	0.005	0	0
766	5.9	635	0.005	0	0
645	6.4	642	0.19	0	0
827	6.9	758	0.0082	0	0
798	7	795	0.005	0	0
818	7.9	699	0.0056	0	0
850	6.8	723	0.011	0	0
816	8.1	646	0.0136	0	0

623	6	634	0.0061	1	0
621	8	560	0.0051	0	0
588	8.6	599	0.336	0	0
577	8.6	708	0.005	0	0
668	6.6	571	0.0095	0	0
739	6.6	741	0.007	0	0
872	7.3	670	0.014	2	0
677	9.3	598	0.01	0	0
759	6.9	700	0.0078	0	0
742	7.4	660	0.052	0	0
622	6.6	475	0.0061	0	0
898	8.6	613	0.0099	0	0
695	8.8	618	0.177	0	0
617	8.6	867	0.005	0	0
756	6.8	681	0.015	0	0
682	9.8	1528	17.3	0	0
627	7.2	491	0.006	0	0
916	7.9	684	0.667	10	0
783	7.6	760	2.1	0	0
777	6.5	663	0.148	0	0
812	6.9	640	0.011	0	0
824	5.6	596	0.0096	0	0
810	6.4	670	0.012	0	0
830	7.1	686	0.878	0	0
589	7.8	750	0.012	0	0
877	8.5	609	2.23	0	0
776	6.3	603	0.022	0	0
919	8.5	703	0.005	0	0
889	8.1	611	0.011	3	0
855	6.7	660	0.05	0	0
874	6.3	543	0.014	0	0
899	8	609	0.484	0	0
883	7.9	585	0.015	0	0
852	6.1	1055	1.73	0	0
853	7.3	728	0.599	0	0
905	8.9	666	1.69	0	0
857	6.9	788	0.005	0	0
910	8.7	704	0.005	0	0
601	8.5	698	9.23	200	2
599	7.8	576	0.005	0	0
670	7.8	537	0.0075	0	0
714	7.1	656	0.0088	0	0
873	8.2	667	0.0098	200	0
706	6.6	720	0.013	0	0
568	10.2	780	0.203	0	0
675	7.5	755	0.011	0	0
880	8	643	0.242	0	0
710	8.8	684	0.0112	0	0

640	7.6	501	0.005	14	0
845	6.2	722	0.017	200	0
869	6.8	720	0.0086	0	0
909	8.1	732	0.005	0	0
860	8.2	559	0.008	0	0
652	6.8	563	0.0184	0	0
594	8.8	750	0.005	200	0
900	8.2	543	1.48	0	0
842	7.9	696	0.024	0	0
665	6	560	0.0085	0	0
752	7.5	604	0.015	0	0
613	4.5	510	0.007	0	0
792	7.7	770	0.0087	0	0
887	8.2	650	0.69	0	0
862	7.9	685	0.014	0	0
712	6.6	830	0.0132	0	0
851	7.2	0	0.0086	0	0
790	6.4	660	0.0067	0	0
597	8.7	639	0.005	0	0
709	8	750	0.0082	0	0
557	6.8	508	0.005	0	0
773	6.9	786	0.0095	200	0
762	6.7	682	0.005	0	0
907	8.9	699	0.005	0	0
863	8.2	731	0.02	0	0
648	6.4	618	2.8	16	0
843	8.3	742	0.117	0	0
859	6.4	630	0.005	0	0
641	9.5	542	0.005	0	0
669	8.1	2500	0.0055	200	0
566	8.9	742	0.005	0	0
572	6.5	1926	20.2	2	0
848	7.5	648	0.913	0	0
618	8.8	731	2.38	11	0
922	9.4	783	0.0059	0	0
713	6.3	647	0.0102	0	0
760	6.8	666	0.005	0	0
563	8.1	941	11.7	5	0
679	8.7	863	0.0091	0	0
619	7.5	765	0.0051	0	0
592	7.7	865	0.033	0	0
875	10	560	0.016	0	0
897	8.5	655	0.013	0	0
635	4.4	540	0.015	0	0
596	7.8	658	0.005	0	0
719	8.8	850	0.432	0	0
755	6.8	654	0.016	0	0
737	6.4	620	0.006	0	0

894	9.1	673	1.81	0	0
576	7.1	680	0.005	0	0
921	8.2	658	0.005	0	0
789	6.9	735	0.315	0	0
630	6	490	0.01	0	0
753	8	686	0.014	0	0
708	8.6	1260	12.8	0	0
651	8.6	560	0.005	0	0
717	6.8	640	0.0082	0	0
661	6	655	0.0085	0	0
770	6.2	675	0.045	0	0
662	6.4	777	4.04	2	0
724	6.9	810	0.019	0	0
604	7.8	719	0.005	0	0
703	8.8	792	1.53	0	0
757	5.9	694	0.005	0	0
672	6.8	800	0.039	0	0
685	7.6	1050	2.94	0	0
690	7.5	800	0.006	0	0
602	6.9	698	0.768	2	0
758	6.1	690	0.033	34	0
595	7.8	727	0.005	3	0
609	8.7	565	0.005	0	0
750	7.8	685	0.005	0	0
689	7.6	3000	24.2	34	0
864	8.5	761	0.103	0	0
751	7.2	570	0.005	0	0
659	7.7	649	0.0085	0	0
829	7.5	760	0.01	0	0
906	8	642	0.005	0	0
924	8	605	0.0279	0	0
681	7.8	830	0.01	0	0
673	7	750	0.013	0	0
605	8	779	0.015	0	0
598	8.2	615	0.005	0	0
904	8.2	647	1.64	0	0
769	5.8	674	0.0062	0	0
768	6.5	796	0.015	0	0
607	8.5	725	0.005	0	0
767	6	590	0.0055	0	0
761	6.5	680	0.005	0	0
821	6.8	764	0.0116	0	0
772	6.5	740	0.005	0	0
908	7.8	701	0.234	0	0
774	8	790	0.018	0	0
574	6.6	901	4.63	4	0
558	8.8	520	0.005	0	0
801	6.5	606	0.856	0	0

560	5.3	571	0.005	200	0
562	7.2	571	0.352	200	0
803	7.4	650	0.01	0	0
564	8.6	1218	16.4	200	0
565	4.7	1169	22.4	0	0
804	7.1	695	0.134	0	0
805	8.1	730	0.125	0	0
920	8.3	701	0.809	0	0
807	7.1	647	0.021	0	0
918	8.2	504	0.016	0	0
582	6	795	0.005	0	0
917	8	642	1.69	0	0
814	6.2	647	0.012	0	0
575	7.3	608	0.005	0	0
788	7.1	639	0.389	0	0
915	8.4	767	1.57	0	0
914	8.6	804	0.007	200	0
838	6.8	660	0.0056	0	0
913	9.2	901	1.81	0	0
912	8.9	651	0.005	0	0
584	4.3	887	1.8	2	0
585	8	800	0.006	0	0
911	7.9	713	1.67	0	0
784	10.1	660	0.016	0	0
782	7.1	708	0.012	0	0
813	5.9	632	0.0097	200	0
791	6.9	770	0.0117	0	0
704	7.9	785	0.367	0	0
747	6.9	687	0.005	0	0
725	6.8	599	0.011	0	0
885	8.6	600	0.014	0	0
723	7.1	584	0.012	0	0
884	10	600	0.02	0	0
654	6.8	394	0.005	0	0
722	6.5	598	0.011	0	0
656	7.6	430	0.0075	0	0
854	8.7	653	0.005	0	0
878	8.2	683	0.446	0	0
729	8	954	0.0103	0	0
876	13.6	595	0.021	200	16
849	5.1	525	0.016	0	0
700	7.5	715	0.005	0	0
671	7.5	758	0.005	0	0
697	9	1100	0.005	200	0
865	8.1	597	0.017	0	0
676	6	689	0.01	0	0
866	7.8	789	0.013	0	0
867	7.1	607	0.062	0	0

799	6.4	728	0.0077	0	0
680	6.9	648	0.01	0	0
868	8.1	726	0.0097	0	0
870	6.8	543	0.01	0	0
705	8	761	0.0085	0	0
631	7.1	523	0.005	0	0
901	8.1	665	1.43	0	0
614	7	699	7.94	200	0
832	7.6	666	0.011	0	0
836	8	780	0.0406	0	0
678	8.9	372	0.793	0	0
837	6.9	766	0.0086	0	0
687	6.8	805	0.029	0	0
624	1.6	694	0.134	0	0
741	6.5	753	0.007	0	0
626	8.6	760	0.005	0	0
647	8.8	662	0.385	165	2
629	8	590	0.006	0	0
903	9	697	0.498	0	0
896	8.7	647	0.0093	1	0
736	7.5	804	0.586	0	0
636	6	545	0.015	0	0
637	8.6	625	0.014	1	0
638	9.6	483	0.035	0	0
639	7.9	590	0.02	0	0
735	7.1	795	0.273	1	0
732	8.6	717	0.0093	0	0
893	10	1015	0.011	0	0
643	7	550	0.005	0	0
731	8.6	730	0.0083	0	0
628	9.2	525	0.008	0	0