Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for SWSD Togiak K12 School Well Public Drinking Water System, Togiak, Alaska PWSID# 263045.001

DRINKING WATER PROTECTION REPORT 1863

Alaska Department of Environmental Conservation

March, 2011

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The Drinking Water Protection (DWP) team of the Drinking Water Program is producing Source Water Assessments in compliance with the Safe Drinking Water Act Amendments of 1996. Each assessment includes a delineation of the source water area, an inventory of potential and existing contaminant sources that may impact the water, a risk ranking for each of these contaminants, and an evaluation of the potential vulnerability of these drinking water sources.

These assessments are intended to provide public water systems owners/operators, communities, and local governments with the best available information that may be used to protect the quality of their drinking water. The assessments combine information obtained from various sources, including the U.S. Environmental Protection Agency, Alaska Department of Environmental Conservation (ADEC), public water system owners/operators, and other public information sources. The results of this assessment are subject to change if additional data becomes available. It is anticipated this assessment will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of public drinking water source. If you have any additional information that may affect the results of this assessment, please contact DWP staff at #1-866-956-7656.

March, 2011

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Drinking Water Protection

Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The public water system for SWSD Togiak K12 School is a Non-Transient, Non-Community (NTNC) Water System consisting of one well. The well addressed by this report (WL001), is located on the SWSD Togiak K12 School lot off of Bayview Drive, Togiak, Alaska. An assessment of the susceptibility of the wellhead and aquifer to contamination, and the vulnerability of the public water system to potential and existing contamination were evaluated as of March 2011. The wellhead received a susceptibility rating of **Low** and the aquifer received a susceptibility rating of **Medium**. Combining these two ratings produces a **Low** rating for the natural susceptibility of the well. Identified potential and existing sources of contamination for the SWSD Togiak K12 School Well public drinking water system include an effluent pump station, wastewater infiltration mound, snow disposal areas, residential areas, heating oil tank, septic tank, and a road. These are considered sources of bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals (VOCs), heavy metals, cyanide, and other inorganic chemicals, synthetic organic chemicals (SOCs), and other organic chemicals (OOCs). Additionally, presumably natural sources of arsenic and nickel are also present.

Combining the natural susceptibility of the well with the six (6) contaminant risk categories, the public water system for SWSD Togiak K12 School Well received an overall vulnerability rating of **Medium** for bacteria and viruses**, Medium** for nitrates and/or nitrites, **Low** for VOCs, **Medium** for heavy metals, cyanide, and other inorganic chemicals, **Low** for SOCs, and **Low** for OOCs.

SWSD TOGIAK K12 SCHOOL WELL PUBLIC DRINKING WATER SYSTEM

SWSD Togiak K12 School public water system is a Non-Transient, Non-Community (NTNC) Water System. The system consists of one well; the well evaluated in this report is located within the NE¼NW¼NE¼NE¼ of Section 15, T13S, R67W, Seward Meridian, Togiak, Alaska (See Map 1 of Appendix A). Togiak is located at the head of Togiak Bay, 67 miles west of Dillingham. It lies in Togiak National wildlife Refuge and is the gateway to Walrus Island Game Sanctuary. (Please see the inset of Map 1 in Appendix A for location). Togiak's current population is approximately 820 (ADCCED, 2009). Communities located within the Southwest Region School District include: Aleknagik, Clarks Point, Ekwok, Koliganek, Manokotak, New Stuyahok, Togiak, and Twin Hills (SWRSD, 2011). In Togiak, water is derived from a well and is treated and stored in a 500,000-gallon tank. The majority of households (125 residences) are connected to the piped water and sewer system; the remaining homes have individual wells and septic tanks. In all, 210 homes are fully plumbed, and 14 are not. The water system is 25 to 30 years old and suffers from broken or corroded pipes, valves, and service connections. A permitted landfill is available (ADCCED, 2009).

Togiak soils are comprised mainly of glacial till and outwash deposited by various Pleistocene glaciers from the surrounding Ahklun Mountains and Aleutian Range. This area is underlain with mixes of glacial alluvial, and marine sediments all cloaked with varying amounts of loess. Permafrost occurs in scattered isolated masses (Southwest Alaska CEDS, 2010).

According to the well log and well construction and testing report for this water system, the depth of the well is estimated at 72.5 feet below land surface (bls). The well was grouted from the pitless level to at least 30 feet using cement slurry. Screens were installed from 62 to 67 feet and from 67 feet to 72.5 feet bls. This well is open to unconsolidated alluvium and bedrock.

The SWSD Togiak K12 School Well public water system serves approximately two-hundred and seventy-two (272) non-transient and sixteen (16) residents through three (3) approved service connections, per the latest sanitary survey (05/26/2009).

SWSD TOGIAK K12 SCHOOL WELL DRINKING WATER PROTECTION AREA

The pathways most likely for surface contamination to reach the groundwater are identified as the first step in determining a drinking water system's risk. These areas are determined by looking at the characteristics of the soil, groundwater, aquifer, and well.

The most probable area for contamination to reach the drinking water well is the drinking water protection

area. The drinking water protection area is the area circling the well (the area influenced by pumping) and also the area upgradient of the well, usually forming a parabola shape. Because releases of contaminants within the protection area are most likely to impact the well, this area will serve as the focus for voluntary protection efforts.

There are many different methods for calculating the size of protection areas. Drinking Water Protection (DWP) uses a combination of two simple groundwater flow equations, the Thiem and uniform flow equations for all groundwater wells screened in unconsolidated material. The orientation of the protection zone is then drawn using a water table elevation map (if available) or a land surface elevation map of the area. The protection zone calculated by the DWP is an estimate using the available information and resources, and may differ slightly from the actual capture zone. Because of uncertainties and changing site conditions, a factor of safety is added to the protection zone to form the drinking water protection area for the well.

The parameters used to calculate the shape of this protection area are general for the whole alluvial plain and were obtained from various United Stated Geological Survey (USGS) reports, area well logs, and the Groundwater textbook by Freeze and Cherry (1979).

The drinking water protection areas (DWPAs) established for wells by the DEC are usually separated into two zones, limited by the watershed. These zones correspond to differences in the time-of-travel (TOT) of the water moving through the aquifer to the well. An analytical calculation was used to determine the size and shape of the protection area. Since this well is open to unconsolidated alluvium and bedrock (bottom 2.5 feet), the immediate watershed was delineated as Zone A with no Zone B.

Because of uncertainties and changing site conditions, a factor of safety is added to the drinking water protection area for the well.

The time of travel for contaminants within the water varies and is dependent on the physical and chemical characteristics of each contaminant. The following is a summary of the two protection area zones for wells and the calculated time-of-travel for each:

Table 1. Definition of Zones

Zone	Definition
A	Several months time-of-travel
B	Less than the 2 year time-of-travel

The DWPA for the SWSD Togiak K12 School Well found on Map 1 of Appendix A will serve as the focus for voluntary protection efforts.

INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

Drinking Water Protection (DWP) has completed an inventory of potential and existing sources of contamination within the SWSD Togiak K12 School Well DWPA. This inventory was completed through a search of agency records and other publicly available information. Potential sources of contamination to the drinking water aquifer include a wide range of categories and types. Potential drinking water contaminants are found within agricultural, residential, commercial, and industrial areas, but can also occur within areas that have little or no development.

For the basis of all Non-Transient, Non-Community (NTNC) Public Water System assessments, the following six categories of drinking water contaminants were inventoried:

- Bacteria and viruses;
- Nitrates and/or nitrites;
- Volatile organic chemicals;
- Heavy metals, cyanide, and other inorganic chemicals;
- Synthetic organic chemicals; and
- Other organic chemicals.

The sources are displayed on Map 2 of Appendix C and summarized in Table 1 of Appendix B.

RANKING OF CONTAMINANT RISKS

Once the potential and existing sources of contamination have been identified, they are each assigned a ranking according to what type and level of risk they represent. Ranking of contaminant risks for a “potential” or “existing” source of contamination is a combination of toxicity and volume associated with that source. Rankings include:

- Low
- Medium
- High
- Very High

The time-of-travel for contaminants within the water varies and is dependent on the physical and chemical characteristics of each contaminant.

Tables 2 through 7 in Appendix B contain the ranking of inventoried potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, synthetic organic chemicals and other organic chemical

VULNERABILITY OF SWSD TOGIAK K12 SCHOOL WELL PUBLIC DRINKING WATER SYSTEM

The vulnerability of public drinking water systems to regulated contaminants is determined by assessing the susceptibility of the wellhead, the susceptibility of the aquifer and the potential contaminant sources identified within the DWPA.

Drinking Water Protection staff developed a vulnerability assessment tool that assigns a vulnerability risk ranking based upon various factors associated with the well, aquifer and potential and existing contaminants identified within the DWPA.

Factors contributing to the susceptibility of the wellhead are: whether the sanitary seal in place, protection from flooding, and if the well casing is properly grouted.

The wellhead for the SWSD Togiak K12 School Well received a **Low** susceptibility rating. The most recent sanitary survey (completed 05/26/2009) indicates that the well is capped with a sanitary seal, the land surface is sloped away from the well, and the well is properly grouted. A sanitary seal prevents potential contaminants from entering the well while sloping of the land surface and grouting help to prevent potential contaminants from traveling down the outside of the well casing.

Factors contributing to the susceptibility of the aquifer are: whether the aquifer is confined or unconfined, whether the well is completed in unconsolidated or fractured bedrock, whether other wells and bore holes are penetrating the aquifer and, if applicable, and the characteristics of the confining layer.

The aquifer that the SWSD Togiak K12 School Well is completed in received a **Medium** susceptibility rating. The system draws water from an unconfined, shallow bedrock aquifer. As an unconfined aquifer is recharged by surface water and precipitation that migrates downward from the surface, it is susceptible to contamination from outside sources.

Table 2 summarizes the susceptibility scores and ratings for SWSD Togiak K12 School Well.

Table 2. Susceptibility

	Rating
Susceptibility of the Wellhead	Low
Susceptibility of the Aquifer	Medium
Natural Susceptibility	Low

The Contaminant Risk was derived from an evaluation of the routine sampling results of the water system and the presence of potential sources of contamination. Contaminant risks to a drinking water source depend on the type and distribution of contaminant sources.

Table 3 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 3. Contaminant Risks

Category	Rating
Bacteria and Viruses	High
Nitrates and/or Nitrites	High
Volatile Organic Chemicals	Medium
Heavy Metals, Cyanide, and Other Inorganic Chemicals	High
Synthetic Organic Chemicals	Low
Other Organic Chemicals	Medium

Finally, an overall vulnerability is determined for each water system by combining each of the contaminant risk scores with the natural susceptibility score:

Natural Susceptibility
+
Contaminant Risks
=
Vulnerability of the
Drinking Water Source to Contamination

Table 4 contains the overall ratings for each of the six categories of drinking water contaminants.

Table 4. Overall Vulnerability

Category	Rating
Bacteria and Viruses	Medium
Nitrates and Nitrites	Medium
Volatile Organic Chemicals	Low
Heavy Metals, Cyanide, and Other Inorganic Chemicals	Medium
Synthetic Organic Chemicals	Low
Other Organic Chemicals	Low

Bacteria and Viruses

The wastewater disposal infiltration mound in the protection area represents the greatest risk for bacteria and viruses to the drinking water well.

Only a small amount of bacteria and viruses are required to endanger public health. Coliform bacteria are found naturally in the environment and although they aren't necessarily a health threat, it is an indicator

of other potentially harmful bacteria in the water, more specifically, fecal coliform bacteria and E. coli which only come from human and animal fecal waste (EPA, 2002). Harmful bacteria can cause diarrhea, cramps, nausea, headaches, or other symptoms (EPA, 2002). No total coliform or fecal coliform have been detected for this well. After combining the contaminant risk for bacteria and viruses with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **Medium**.

Nitrates and Nitrites

The wastewater disposal infiltration mound and natural sources in the protection area represent the greatest risk for nitrates and nitrites to this source of public drinking water.

Nitrates are very mobile, moving at approximately the same rate as water. Sampling history for SWSD Togiak K12 School Well indicates that concentrations of nitrate have been detected. At the latest sampling period (09/27/2010), a concentration of nitrate and/or nitrite was detected at 0.1 milligrams per liter (mg/L) or 1% of the Maximum Contaminant Level (MCL) of 10 mg/L. The MCL is the maximum level of contaminant that is allowed to exist in drinking water and still be consumed by humans without harmful health effects.

Nitrate concentrations in uncontaminated groundwater are typically less than 2 mg/L and are derived primarily from the decomposition of organic matter in soils (Wang, Strelakos, Jokela, 2000). The levels detected in source waters are very low and are considered safe to drink.

After combining the contaminant risk for nitrates and nitrites with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **Medium**.

Volatile Organic Chemicals

The wastewater holding tank represents the greatest risk for volatile organic chemicals (VOCs) to the well.

VOCs have not been detected within source waters. After combining the contaminant risk for volatile organic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **Low**.

Heavy Metals, Cyanide, and Other Inorganic Chemicals

The wastewater disposal infiltration mound and wastewater holding tank in the protection area and natural sources represent the greatest risk for inorganic chemicals to the well.

Heavy metals and other inorganic chemicals were collected on separate occasions in 2009 and 2010. Chromium and Nickel were detected well below its respective maximum contaminant levels (MCLs). Arsenic was detected at 0.00405 mg/L or 40.5% of the MCL. Arsenic has no man-made source in this area and is presumed to be naturally occurring.

After combining the contaminant risk for heavy metals, cyanide and other inorganic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **Medium**.

Synthetic Organic Chemicals

The residential septic tanks, roads, and residential areas represent the greatest risk for synthetic organic chemicals (SOCs) to the well.

SOCs have not been sampled from this well. After combining the contaminant risk for SOCs with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **Low**.

Other Organic Chemicals

The wastewater infiltration mound represents the greatest risk for other organic chemicals (OOCs) to the well.

OOCs have not been sampled from this well. After combining the contaminant risk for OOCs with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **Low**.

Using the Source Water Assessment

This assessment of contaminant risks can be used as a foundation for local voluntary protection efforts as well as a basis for the continuous efforts on the part of SWSD Togiak K12 School Well to protect public health. It is anticipated that Source Water Assessments will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of the SWSD Togiak K12 School Well drinking water source.

REFERENCES

Alaska Department of Commerce, Community and Economic Development (ADCCED), 2008 [WWW document], URL http://www.commerce.state.ak.us/dca/commdb/CF_COMDB.htm

Alaska Volcano Observatory: Togiak Volcanics - Geologic, Topographic, and Location Maps [WWW document], URL http://www.avo.alaska.edu/volcanoes/volcmap.php?volcname=Togiak%20volcanics

Freeze, R.A. and Cherry, J.A., 1979, Groundwater, Prentice-Hall, Englewood Cliffs, NJ

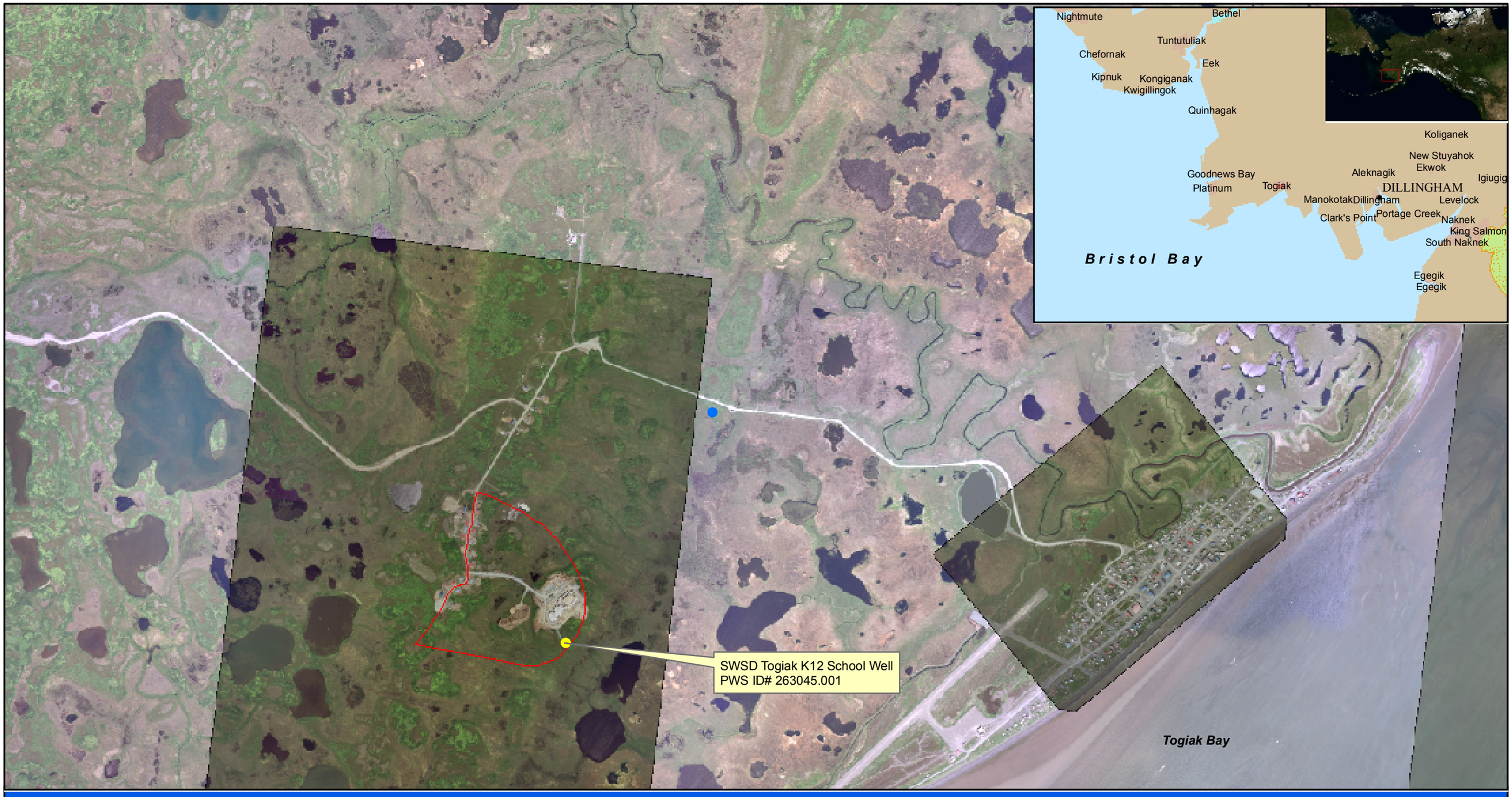
Southwest Alaska Comprehensive Economic Development Strategy, May 2010 [WWW document], URL http://www.dced.state.ak.us/ded/dev/oedp/pubs/SWAMC_Combined_2010_CEDS_Report_compressed.pdf

United States Environmental Protection Agency (EPA), 2008 [WWW document], URL http://www.epa.gov/safewater/contaminants/index.html

Wang, B., Strelakos, P.M., and Jokela, J.B., 2000, Nitrate source indicators in ground water of the Scimitar Subdivision, Peters Creek Area, Anchorage, Alaska: US Geological Survey Water-Resources Investigations Report 00-4137.

APPENDIX A

SWSD Togiak K12 School Well
Drinking Water Protection Area Location Map
(Map 1)



Map 1 - SWSD Togiak K12 School

PWS ID# 263045.001

Alaska Department of Environmental Conservation

0 0.15 0.3 0.6 Miles

1:15,420

N W E S

DATA SOURCES:

Aerial Imagery: Virtual Earth, Microsoft Live Search Maps (http://maps.live.com), ADCCED DCRA Photos (http://maps.commerce.alaska.gov/arcgis/services)

Public Drinking Water Sources: Alaska Department of Environmental Conservation

Drinking Water Protection Areas: Alaska Department of Environmental Conservation

Public Water Systems

- Community water system (CWS) source (formerly: Class A)
- Non-transient, non-community (NTNC) water system source (formerly: Class A).

Drinking Water Protections Areas

- Zone A: Several-month time-of-travel for groundwater sources.

Anne Gleason 01/24/2011

APPENDIX B

Contaminant Source Inventory and Risk Ranking for SWSD Togiak K12 School Well (Tables 1-7)

Table 1

Contaminant Source Inventory for
SWSD TOGIAK K12 SCHOOL

PWSID 263045.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	2	Effluent pump station
Domestic wastewater sludge land application areas	D04	D04-01	A	2	Wastewater disposal infiltration mound, 80' x 150'
Injection wells (Class V) Abandoned Drinking Water Wells	D28	W01-01	A	2	Togiak School Site Well #1 - Decommissioned on 11/2003.
Snow disposal areas	D60	D60-01	A	2	Snow stacking area, northeast of school building
Snow disposal areas	D60	D60-02	A	2	Snow stacking area, north of the school building
Snow disposal areas	D60	D60-03	A	2	Snow stacking area, northwest of the school building
Residential Areas	R01	R01-15	A	2	Part of Bayview Subdivision
Closed tanks, heating oil, nonresidential (aboveground)	T15	T15-01	A	2	30,000-gallon fuel oil tank
Wastewater Holding Tank	T22	T22-01	A	2	8000-gallon septic tank
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	2	Service Road/Site Access Road

Table 2

Contaminant Source Inventory and Risk Ranking for SWSD TOGIAK K12 SCHOOL Sources of Bacteria and Viruses

PWSID 263045.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Medium	2	Effluent pump station
Domestic wastewater sludge land application areas	D04	D04-01	A	High	2	Wastewater disposal infiltration mound, 80' x 150'
Residential Areas	R01	R01-15	A	Low	2	Part of Bayview Subdivision
Wastewater Holding Tank	T22	T22-01	A	Low	2	8000-gallon septic tank
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	2	Service Road/Site Access Road

Table 3

Contaminant Source Inventory and Risk Ranking for SWSD TOGIAK K12 SCHOOL Sources of Nitrates/Nitrites

PWSID 263045.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Medium	2	Effluent pump station
Domestic wastewater sludge land application areas	D04	D04-01	A	High	2	Wastewater disposal infiltration mound, 80' x 150'
Residential Areas	R01	R01-15	A	Low	2	Part of Bayview Subdivision
Wastewater Holding Tank	T22	T22-01	A	Low	2	8000-gallon septic tank
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	2	Service Road/Site Access Road

Table 4

Contaminant Source Inventory and Risk Ranking for SWSD TOGIAK K12 SCHOOL Sources of Volatile Organic Chemicals

PWSID 263045.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Low	2	Effluent pump station
Domestic wastewater sludge land application areas	D04	D04-01	A	Low	2	Wastewater disposal infiltration mound, 80' x 150'
Snow disposal areas	D60	D60-01	A	Low	2	Snow stacking area, northeast of school building
Snow disposal areas	D60	D60-02	A	Low	2	Snow stacking area, north of the school building
Snow disposal areas	D60	D60-03	A	Low	2	Snow stacking area, northwest of the school building
Residential Areas	R01	R01-15	A	Low	2	Part of Bayview Subdivision
Closed tanks, heating oil, nonresidential (aboveground)	T15	T15-01	A	Low	2	30,000-gallon fuel oil tank
Wastewater Holding Tank	T22	T22-01	A	Medium	2	8000-gallon septic tank
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	2	Service Road/Site Access Road

Table 5

Contaminant Source Inventory and Risk Ranking for SWSD TOGIAK K12 SCHOOL

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

PWSID 263045.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Low	2	Effluent pump station
Domestic wastewater sludge land application areas	D04	D04-01	A	Medium	2	Wastewater disposal infiltration mound, 80' x 150'
Snow disposal areas	D60	D60-01	A	Low	2	Snow stacking area, northeast of school building
Snow disposal areas	D60	D60-02	A	Low	2	Snow stacking area, north of the school building
Snow disposal areas	D60	D60-03	A	Low	2	Snow stacking area, northwest of the school building
Residential Areas	R01	R01-15	A	Low	2	Part of Bayview Subdivision
Wastewater Holding Tank	T22	T22-01	A	Medium	2	8000-gallon septic tank
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	2	Service Road/Site Access Road

Table 6

Contaminant Source Inventory and Risk Ranking for SWSD TOGIAK K12 SCHOOL Sources of Synthetic Organic Chemicals

PWSID 263045.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Low	2	Effluent pump station
Domestic wastewater sludge land application areas	D04	D04-01	A	Low	2	Wastewater disposal infiltration mound, 80' x 150'
Residential Areas	R01	R01-15	A	Low	2	Part of Bayview Subdivision

Table 7

Contaminant Source Inventory and Risk Ranking for SWSD TOGIAK K12 SCHOOL

Sources of Other Organic Chemicals

PWSID 263045.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-01	A	Low	2	Effluent pump station
Domestic wastewater sludge land application areas	D04	D04-01	A	Low	2	Wastewater disposal infiltration mound, 80' x 150'
Residential Areas	R01	R01-15	A	Low	2	Part of Bayview Subdivision
Wastewater Holding Tank	T22	T22-01	A	Medium	2	8000-gallon septic tank
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	2	Service Road/Site Access Road

APPENDIX C

SWSD Togiak K12 School Well
Drinking Water Protection Area
and Potential and Existing Contaminant Sources
(Map 2)

Zone A:
- 1 Effluent Pump Station, D01
- 1 Wastewater Disposal Infiltration Mound, D04
- 3 Snow Stacking Areas, D60
- 1 Fuel Oil Tank, T15
- 1 Septic Tank, T22
- Approximately 15 Acres of Residential Areas, R02
- Drinking Water Well (Decommissioned), D28
- 1 Road, X20

SWSD Togiak K12 School Well
PWS ID# 263045.001

Bayview Subdivision

Bayview Subdivision

Bayview Subdivision

Map 2 - SWSD Togiak K12 School

PWS ID# 263045.001

Alaska Department of Environmental Conservation

0 0.05 0.1 0.2 Miles

1:4,800

1:8,016 (Inset)

N W E S

DATA SOURCES:

Aerial Imagery: ADCCED DCRA Photos (http://maps.commerce.alaska.gov/arcgis/services)
ADCCED DCRA Community Profiles (http://www.commerce.state.ak.us/dca/profiles/profilemaps.htm)
Public Drinking Water Source Drinking Water Protection Areas and Potential and Existing Sources of Contamination
Alaska Department of Environmental Conservation

Public Water Systems
- Community water system (CWS) source (formerly: Class A)
- Non-transient, non-community (NTNC) water system source (formerly: Class A).

Drinking Water Protections Areas
- Zone A: Several-month time-of-travel for groundwater sources.

Potential and Existing Sources of Contamination
- Domestic wastewater collection systems (sewer lines or lift stations) (D01)
- Drinking Water Well, Decommissioned (D28)
- Snow disposal areas (D60)
- Closed tank, heating oil, nonresidential (underground) (T15)
- Wastewater Holding Tank (T22)
- Domestic wastewater sludge land application areas (D04)

Anne Gleason 03/03/2011