Spatial and Temporal Nitrate Variations in Groundwater from Southern Saipan

CAPT Derek Chambers

June 2009
Pacific Islands Environmental Conference

June 1, 2007

CUC issues a Public Notice about high nitrate levels in the drinking water

.... Danogu uppeureu iii

Ciner Judge Alex K. Munson

The federal government, rep-



COMMONWEALTH UTILITIES CORPORATION



DRINKING WATER WARNING

Areas of Saipan's water system have high levels of Nitrate

DO NOT GIVE THE WATER TO INFANTS UNDER 6 MONTHS OLD OR USE IT TO MAKE INFANT FORMULA

Test results have just been provided to the Commonwealth Utilities Corporation from its California laboratory. Water samples are collected every three months, and the results received this week on Saipan showed nitrate levels at two water sources are above the allowable standard, or maximum contaminant level (MCL), of the CNMI Drinking Water Regulations.

Koblerville:

The "Matrias Well" contains nitrate levels of 11 parts per million. It is the source of water for residents in As Gonno, along Magisa Drive.

SUN	MON	TUE	WED	THU	FRI	SAT
JUN 24	JUN 25	JUN 26	JUN 27	JUN 28	JUN 29	JUN 30
JUL 1	JUL 2	JUL 3	JUL 4	JUL 5	JUL 6	JUL 7
JUL 8	JUL 9	JUL 10	JUL 11	JUL 12	JUL13	JUL 14
JUL 15	JUL 16	JUL 17	JUL 18	JUL 19	JUL 20	JUL 21
JUL 22	JUL 23	JUL 24	JUL 25	JUL 26	JUL 27	JUL 28

SUN	MON	TUE	WED	THU	FRI	SAT
JUN 24	JUN 25	JUN 26	JUN 27	JUN 28 CUC sample	JUN 29 46 sites	JUN 30
JUL 1	JUL 2	JUL 3	JUL 4	JUL 5	JUL 6	JUL 7
JUL 8	JUL 9	JUL 10	JUL 11	JUL 12	JUL13	JUL 14
JUL 15	JUL 16	JUL 17	JUL 18	JUL 19	JUL 20	JUL 21
JUL 22	JUL 23	JUL 24	JUL 25	JUL 26	JUL 27	JUL 28

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JUL 8	JUL 9 Results 8 > MCL	JUL 10	JUL 11	JUL 12	JUL13	JUL 14
JUL 15	JUL 16	JUL 17	JUL 18	JUL 19	JUL 20	JUL 21
JUL 22	JUL 23	JUL 24	JUL 25	JUL 26	JUL 27	JUL 28

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JUL 8	JUL 9 Results 8 > MCL	JUL 10	JUL 11	JUL 12 DEQ 46 wells	JUL13 Results all < MCL	JUL 14
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JUL 22	JUL 23	JUL 24	JUL 25	JUL 26	JUL 27	JUL 28

June-July Results 2007

- > June 28-29 CUC/MW
 - KV 25 EP = 14.3 mg/l
 - SV 7 = 10.9 mg/l
 - IF 5 = 10.9 mg/l
 - IF 16 = 14.2 mg/l
 - IF 205 = 14.2 mg/l
 - OB 14 EP = 12.6 mg/l
 - Mafnas = 10.9 mg/l

- July 12 DEQ
 - KV 25 = 8.84 mg/l
 - SV 7 = 4.22 mg/l
 - IF 5 = 5.91 mg/l
 - IF 16 = 5.28 mg/l
 - IF 205 = 4.73 mg/l
 - OB 14 = not sampled
 - Mafnas = 5.61 mg/l

This is why we wanted to study nitrate variations

WERI Council Meeting

- October 2007 WERI Advisory Council Meeting
- Nitrate issue discussed
- Listed as a priority research concern

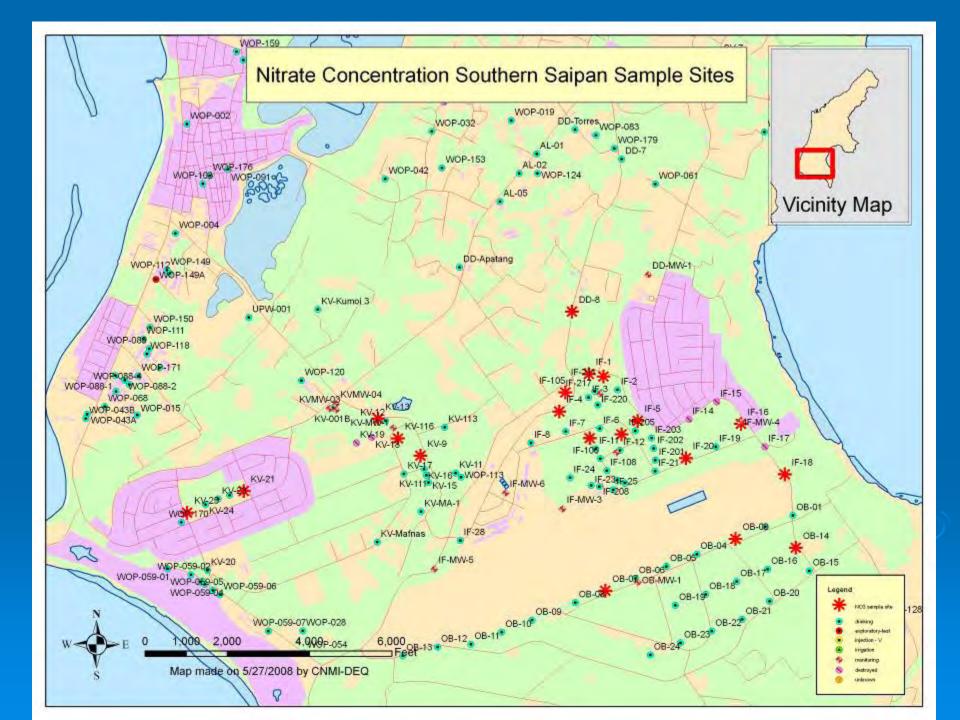
DEQ & CUC discuss the possibility of doing the research themselves

Grant Process

- > DEQ and CUC prepared a grant proposal
- Submitted by mid December 2007
- March 2008 DEQ & CUC notified that grant proposal was accepted
- Ordered equipment in April 2008
- Started collecting data in late May 2008

The study

- Picked 20 wells in Southern Saipan
- > Collected samples weekly for one year
 - pH, temperature
 - Conductivity, Salinity, TDS
 - turbidity
 - Nitrates (at DEQ lab)
- > Installed rain gauges at four sites



Collecting Samples

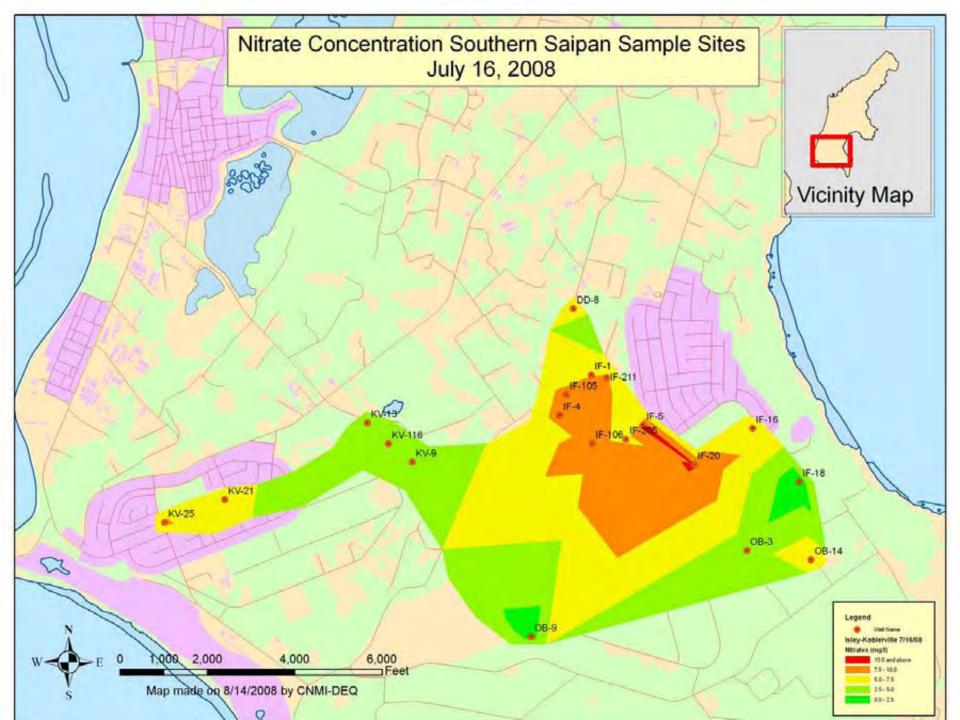




Rainfall Data







Nitrate mg/l

Results

- Very little variation in nitrates in the groundwater with changes in rainfall
- Don't know why there were big changes in July 2007
- Did find changes in salinity with rainfall or well pumping rates

Conclusion

▶ If you have a research question, you may be able to do the study yourself!