

Spatial and Temporal Nitrate Variations in Groundwater from Southern Saipan

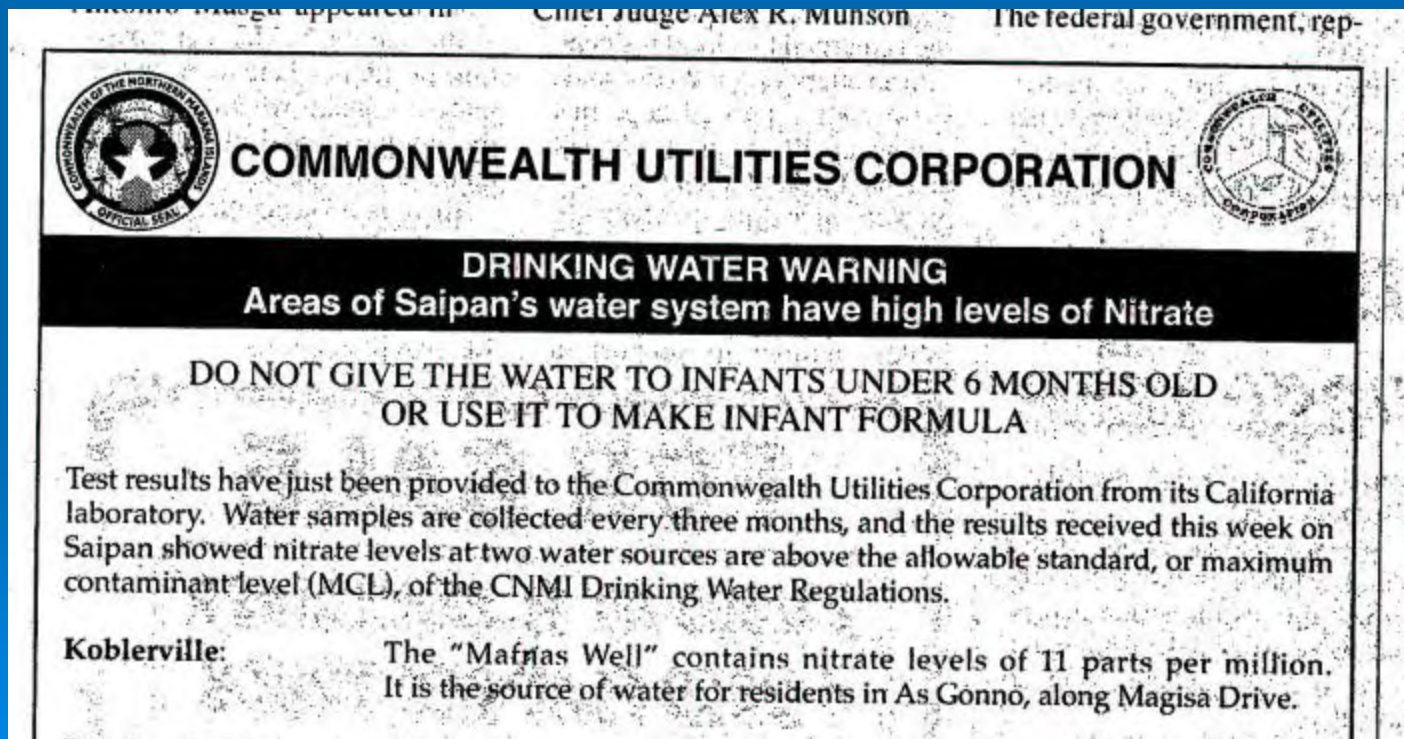
CAPT Derek Chambers

June 2009

Pacific Islands Environmental Conference

June 1, 2007

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



SUN MON TUE WED THU FRI SAT

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SUN MON TUE WED THU FRI SAT

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CUC
sample

46 sites

JUL 1

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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 Results 8 > MCL	JUL 10	JUL 11	JUL 12	JUL 13	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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CUC
sample

JUN 29

46 sites

JUN 30

JUL 1

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Results
8 > MCL

JUL 10

JUL 11

JUL 12

DEQ 46
wells

JUL 13

JUL 14

JUL 15

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JUL 23

JUL 24

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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 Results 8 > MCL	JUL 10	JUL 11	JUL 12 DEQ 46 wells	JUL 13 Results all < MCL	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

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
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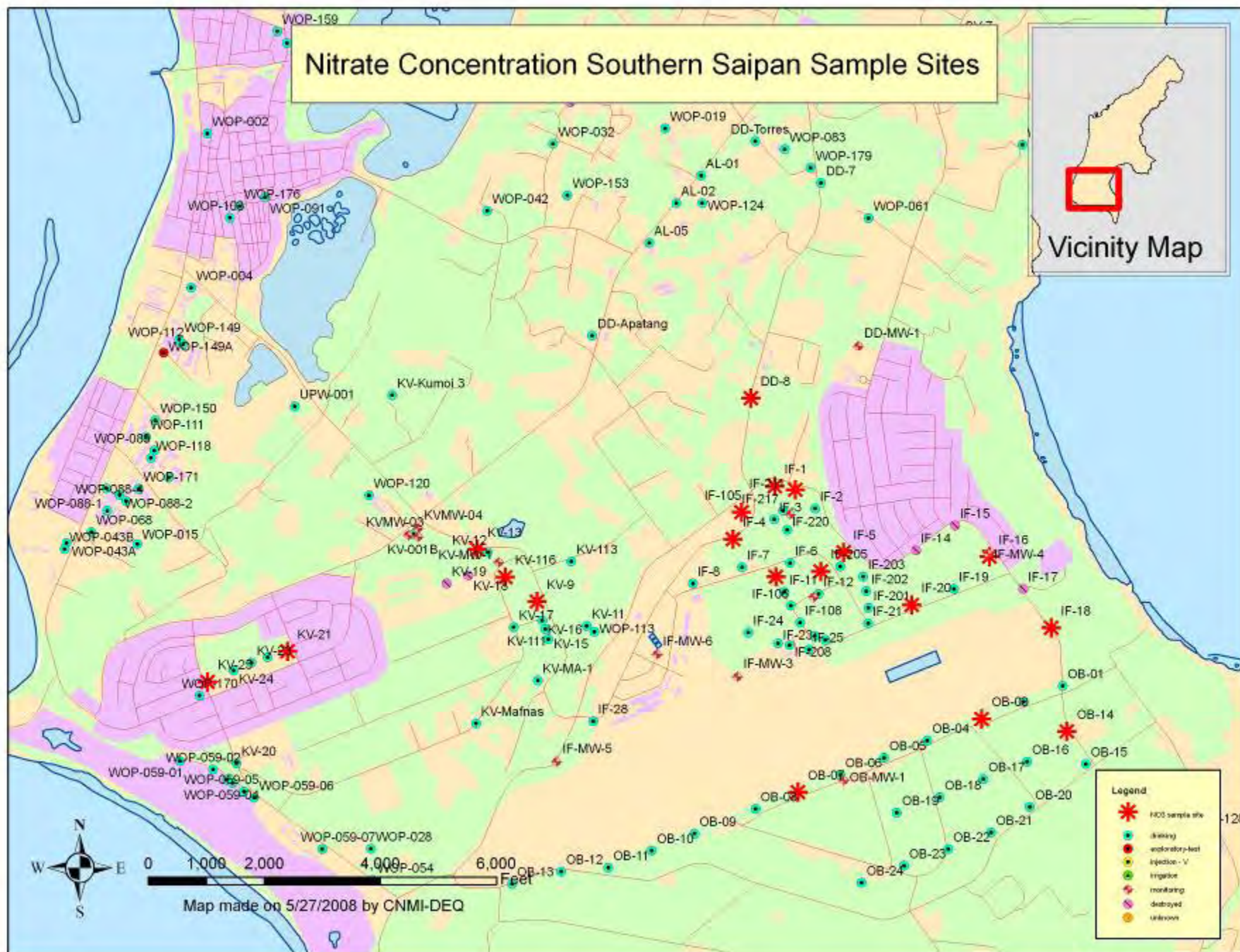
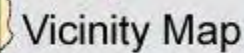
Grant Process

- 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

Nitrate Concentration Southern Saipan Sample Sites



Map made on 5/27/2008 by CNMI-DEQ

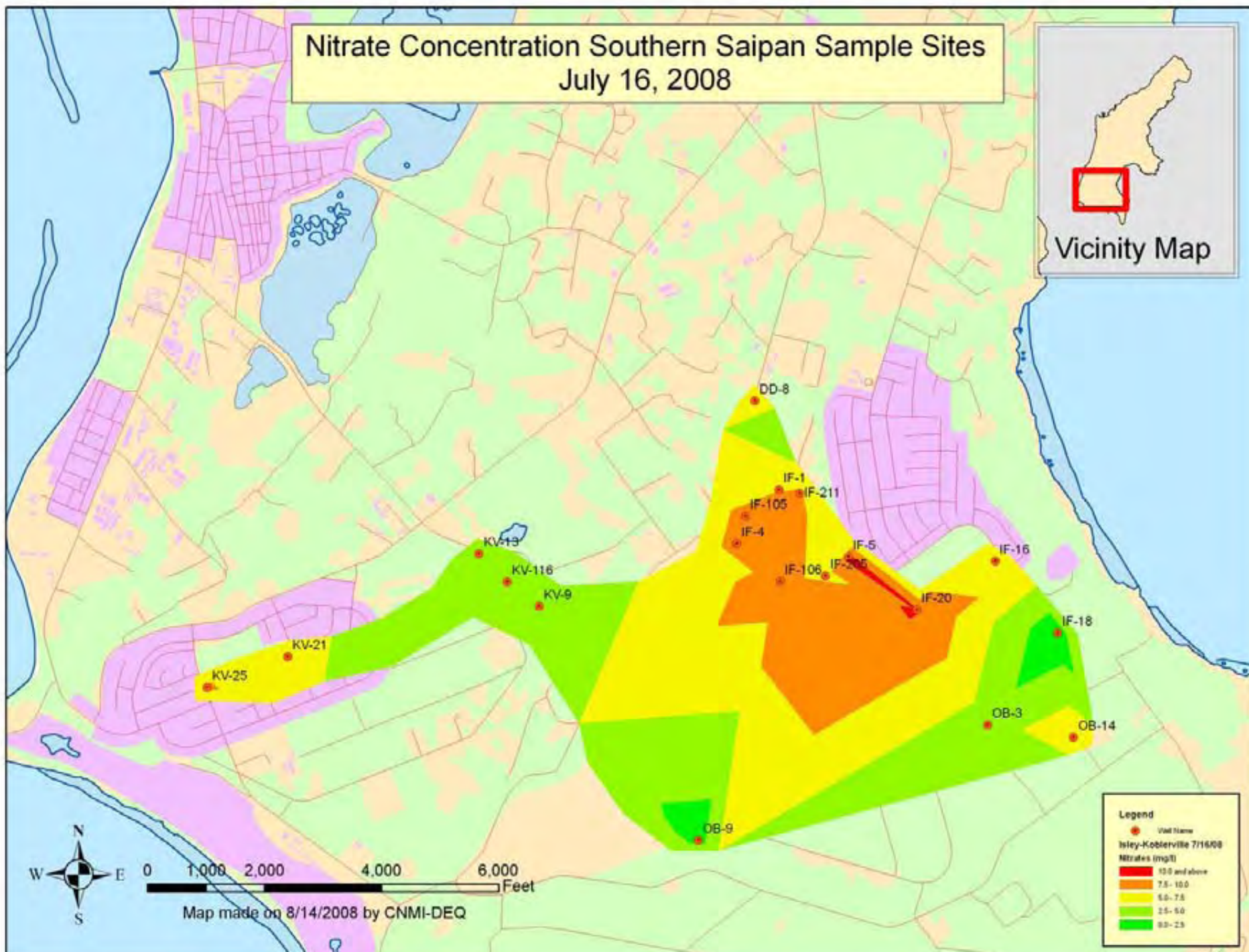
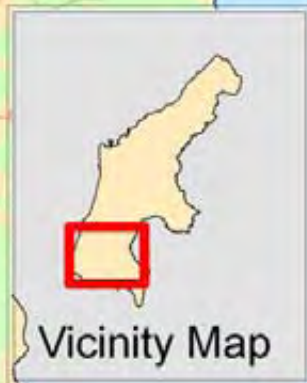
Collecting Samples



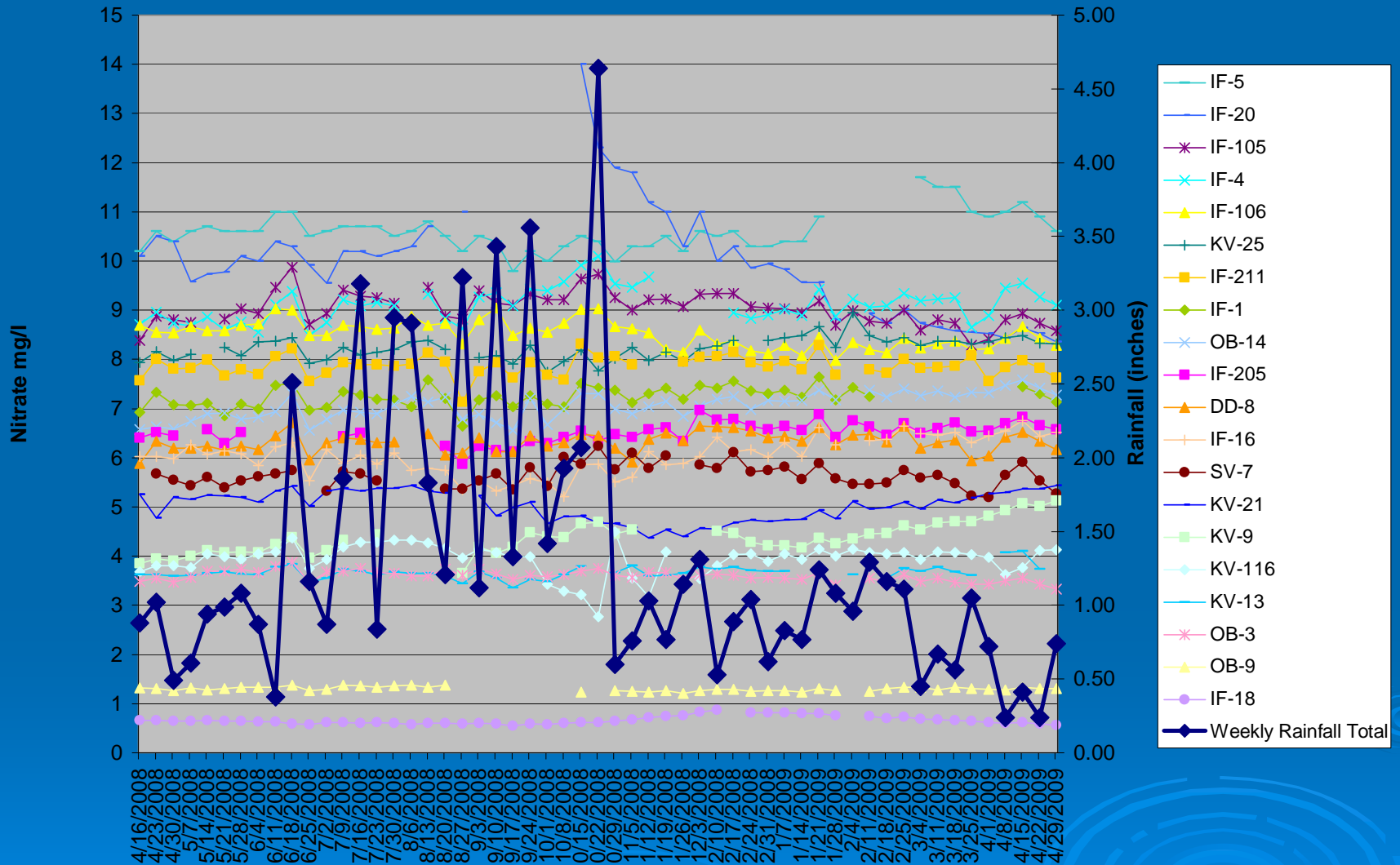
Rainfall Data



Nitrate Concentration Southern Saipan Sample Sites July 16, 2008



Weekly Rainfall & Nitrate Concentration



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!