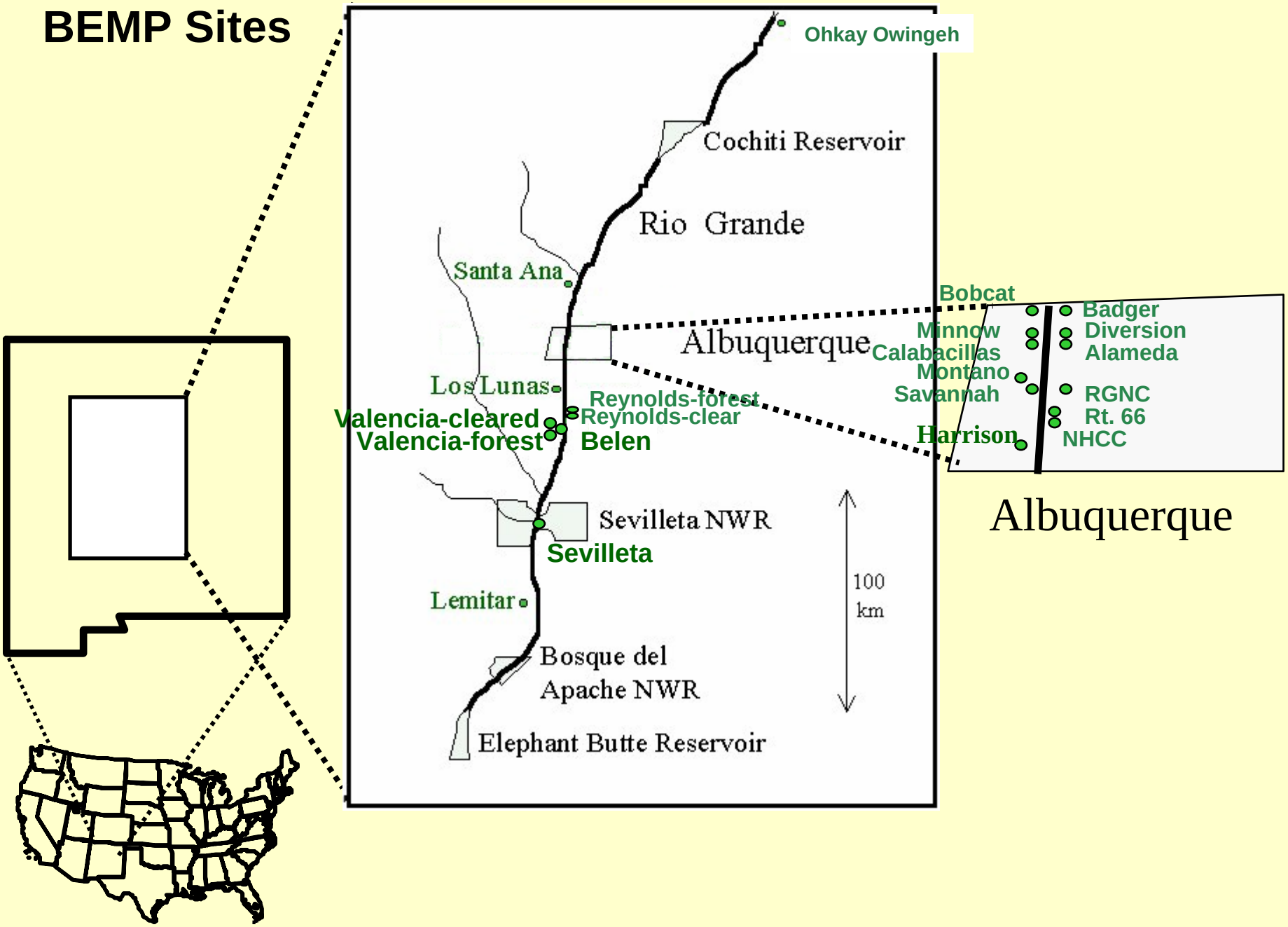
Bosque Ecosystem Monitoring Program:

Groundwater and surface water chemistry

Kim Eichhorst

BEMP Sites


Ohkay Owingeh
Cochiti Reservoir
Rio Grande
Santa Ana
Albuquerque
Los Lunas
Reynolds-forest
Reynolds-clear
Valencia-cleared
Valencia-forest
Belen
Sevilleta NWR
Sevilleta
Lemitar
Bosque del
Apache NWR
Elephant Butte Reservoir
100
km
Bobcat
Badger
Minnow
Diversion
Calabacillas
Alameda
Montano
Savannah
RGNC
Rt. 66
Harrison
NHCC
Albuquerque

Sampling

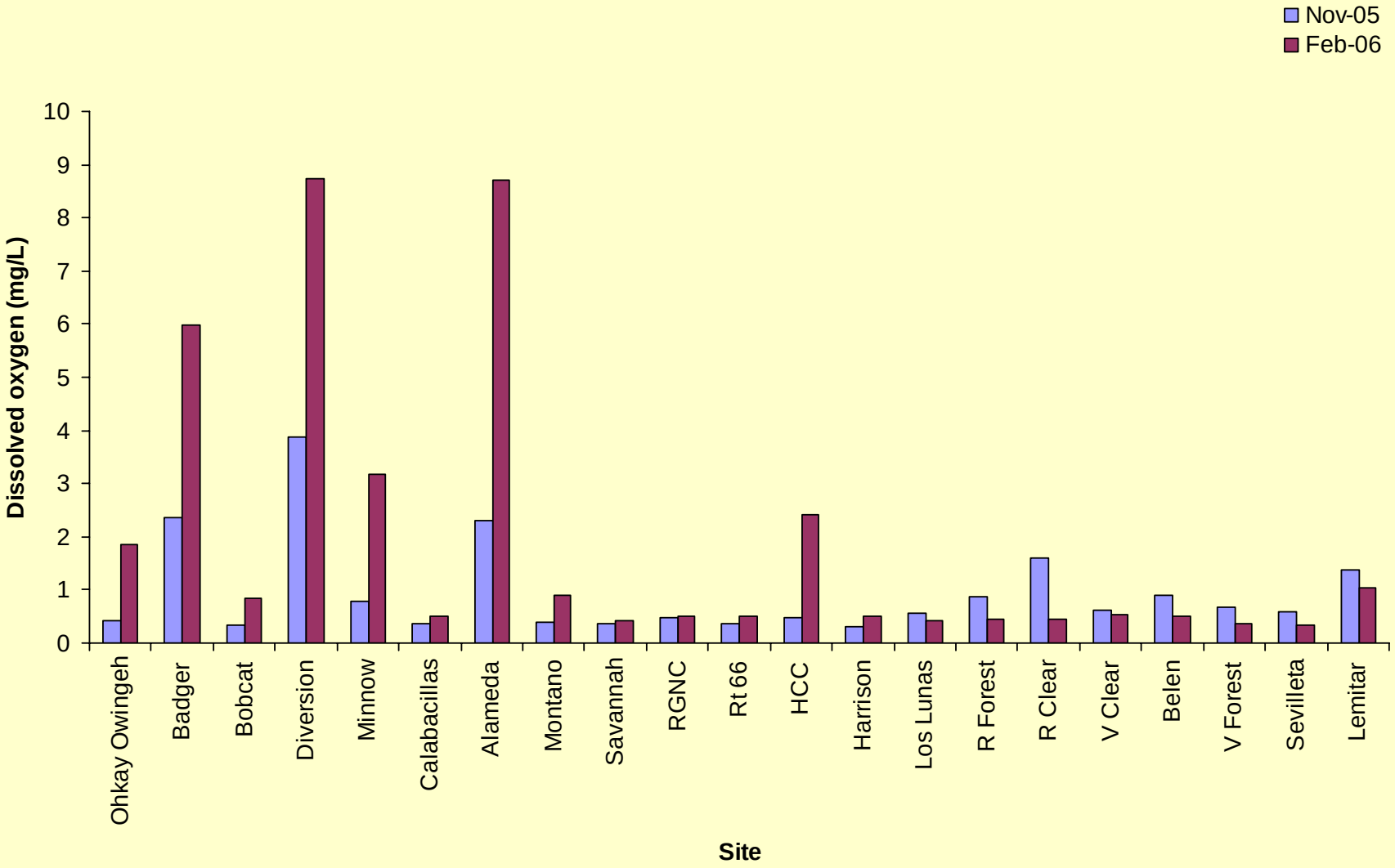
- 21 sites (GW)
- 5 wells, 40 m apart
- 14 sites (SW)

- 4 times/year:
  - Feb/March (before runoff)
  - May/June (after runoff)
  - August/Sept (growing season)
  - Nov/Dec (after growing season)

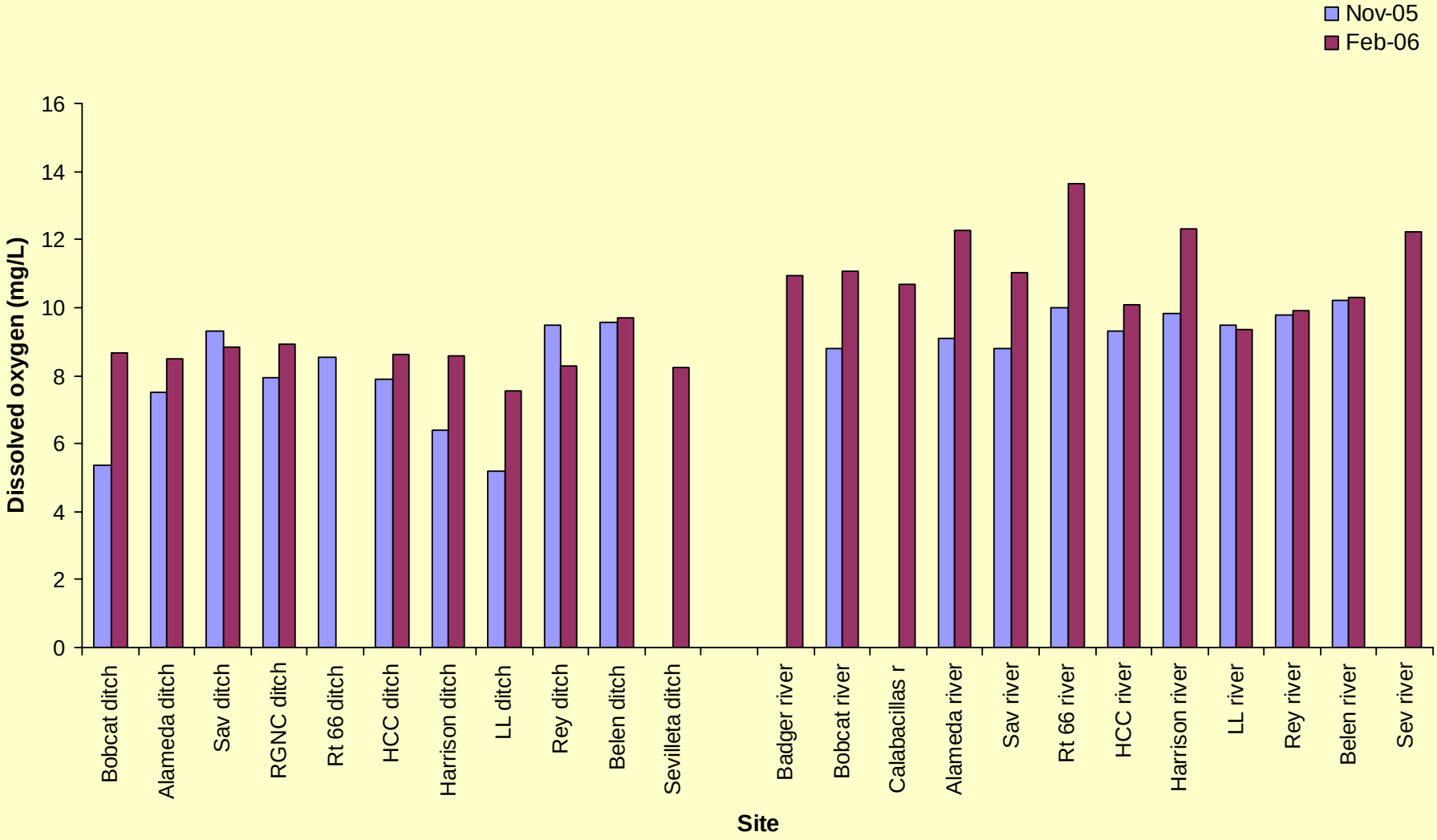
Water Quality

- Depth to water
- Temperature
- pH
- Specific conductance
- Turbidity
- Dissolved oxygen
- Chloride
- Ammonium
- Nitrate
- Phosphate
- Bromide
- Sulfate

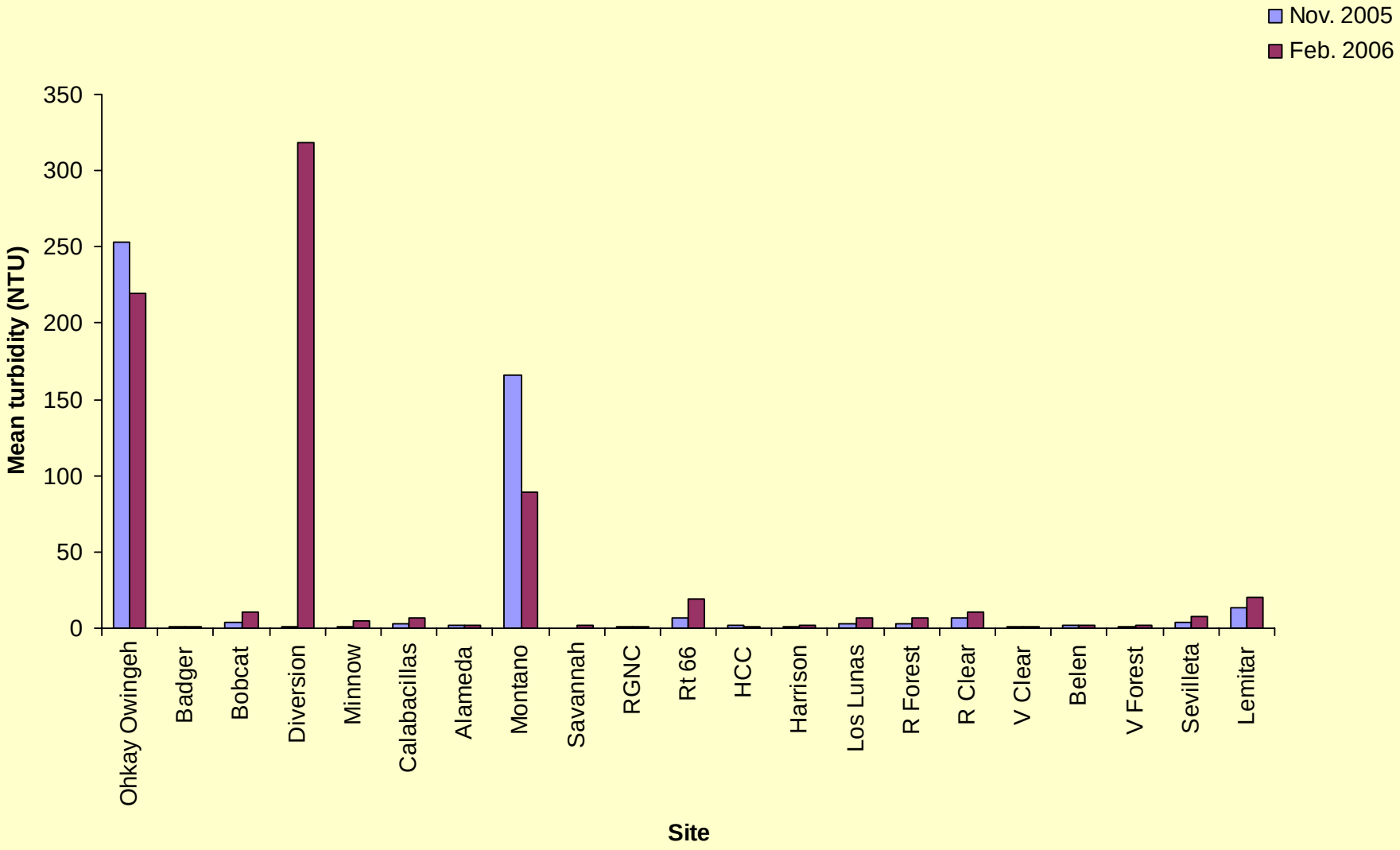
Groundwater Dissolved Oxygen



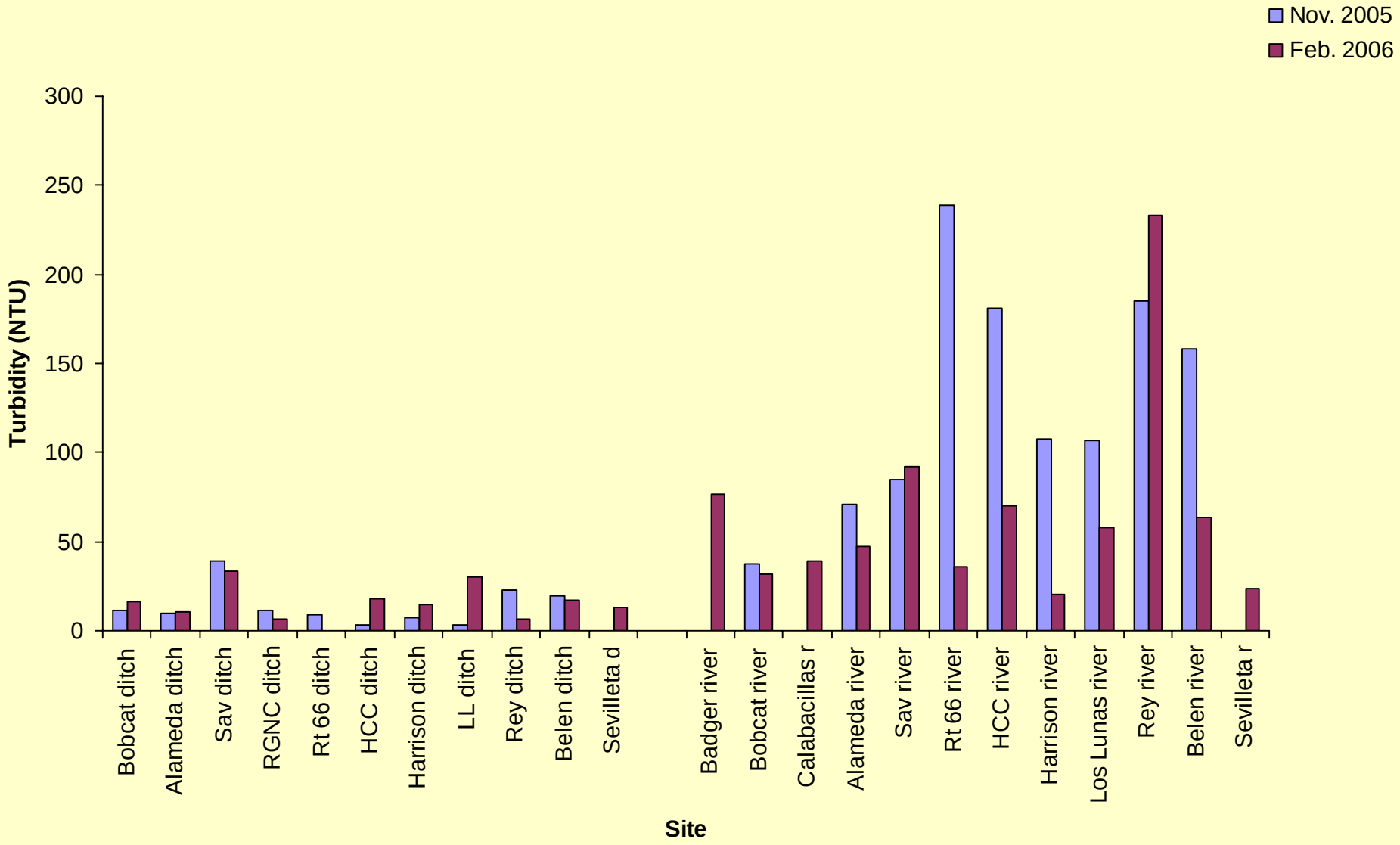
Surface Water Dissolved Oxygen



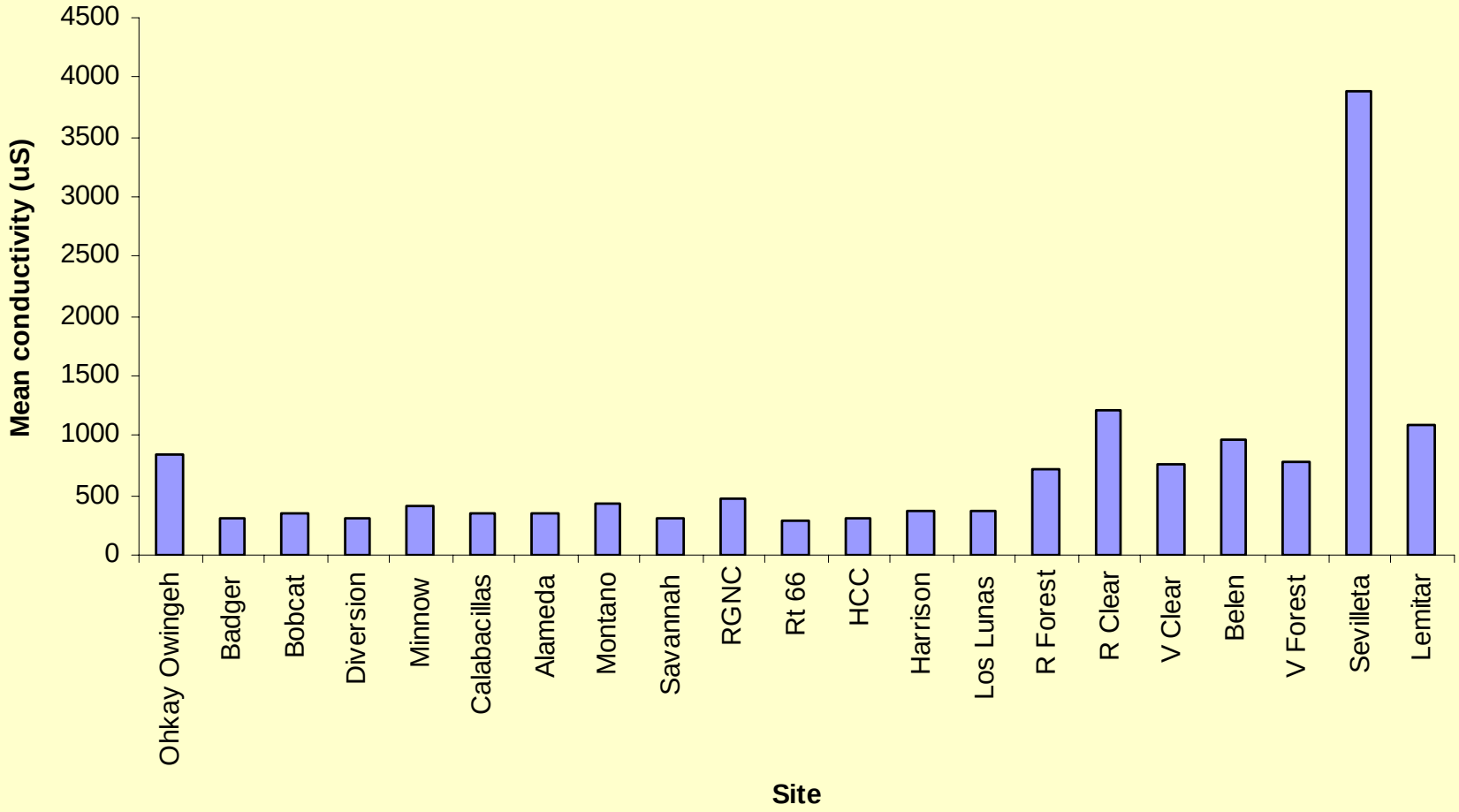
Groundwater Turbidity



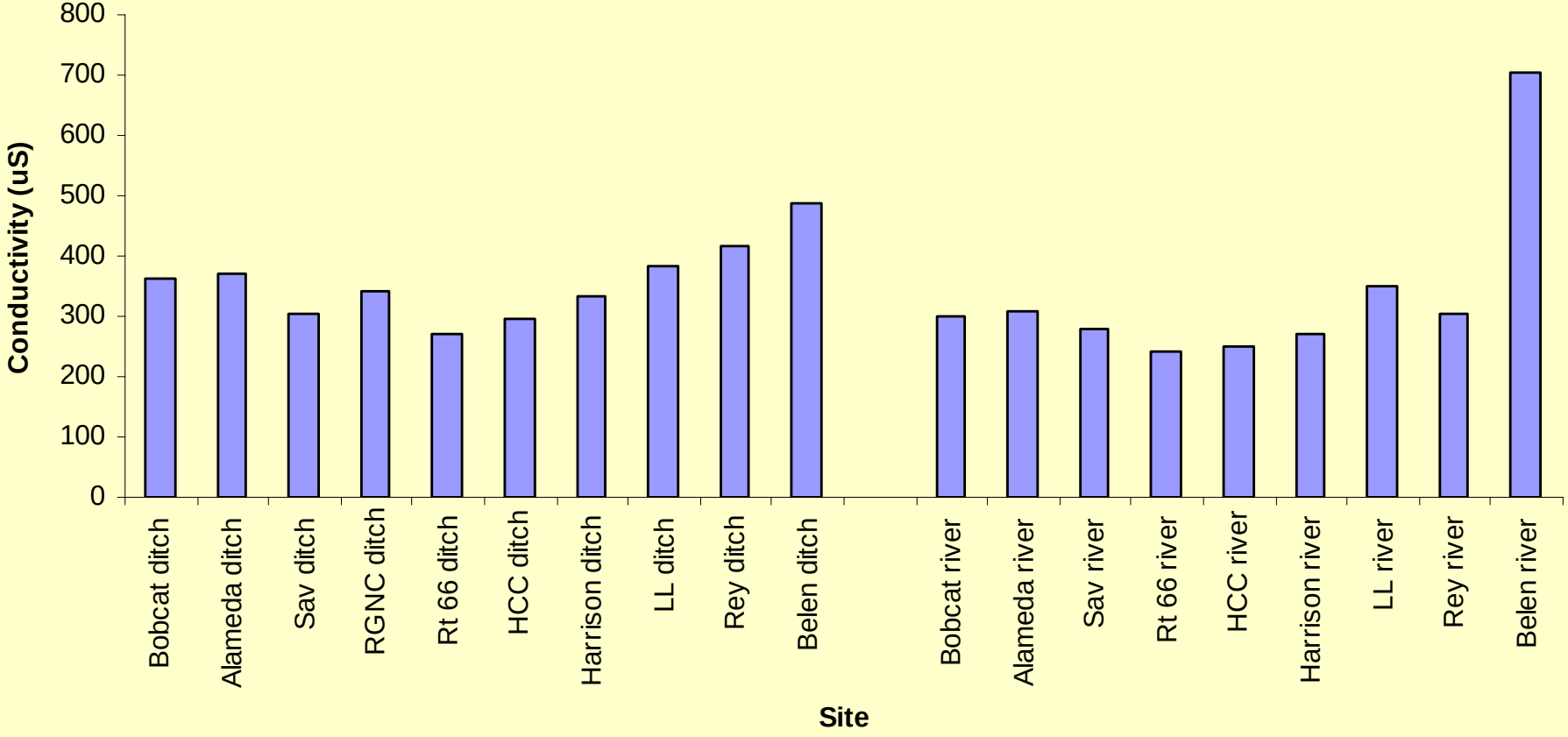
Surface Water Turbidity



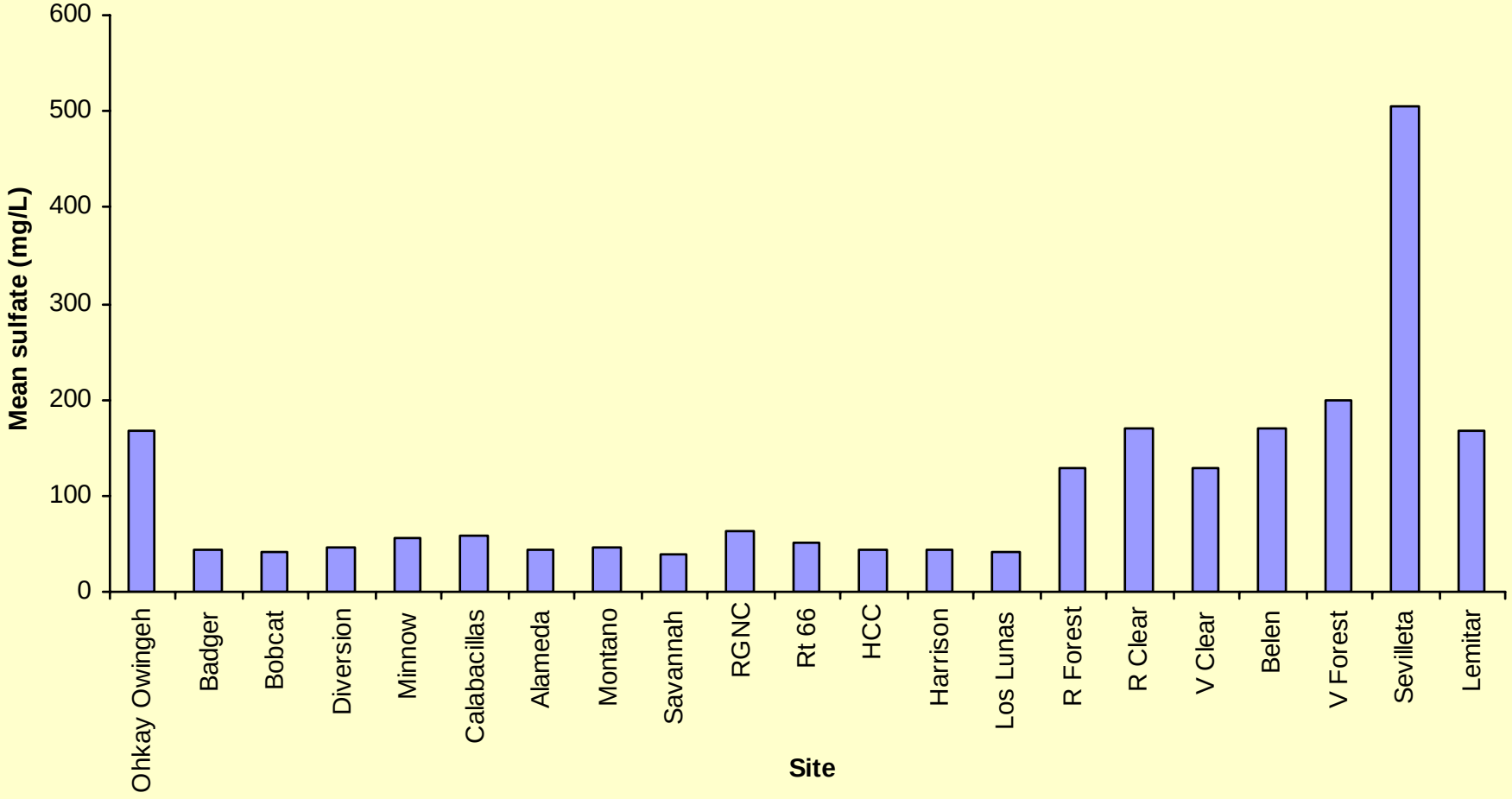
Groundwater Specific Conductance 11/05



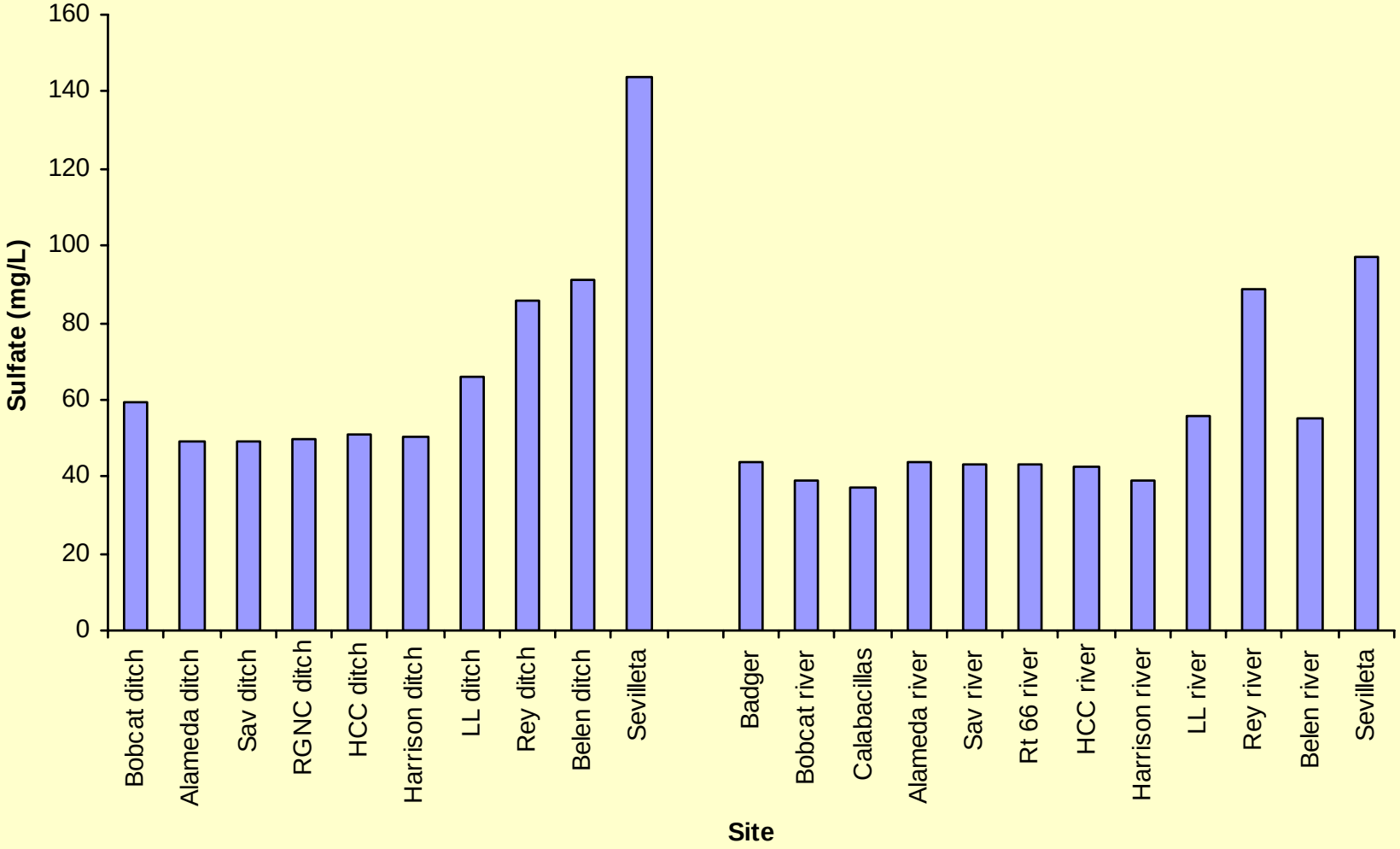
Surface Water Specific Conductance 11/05



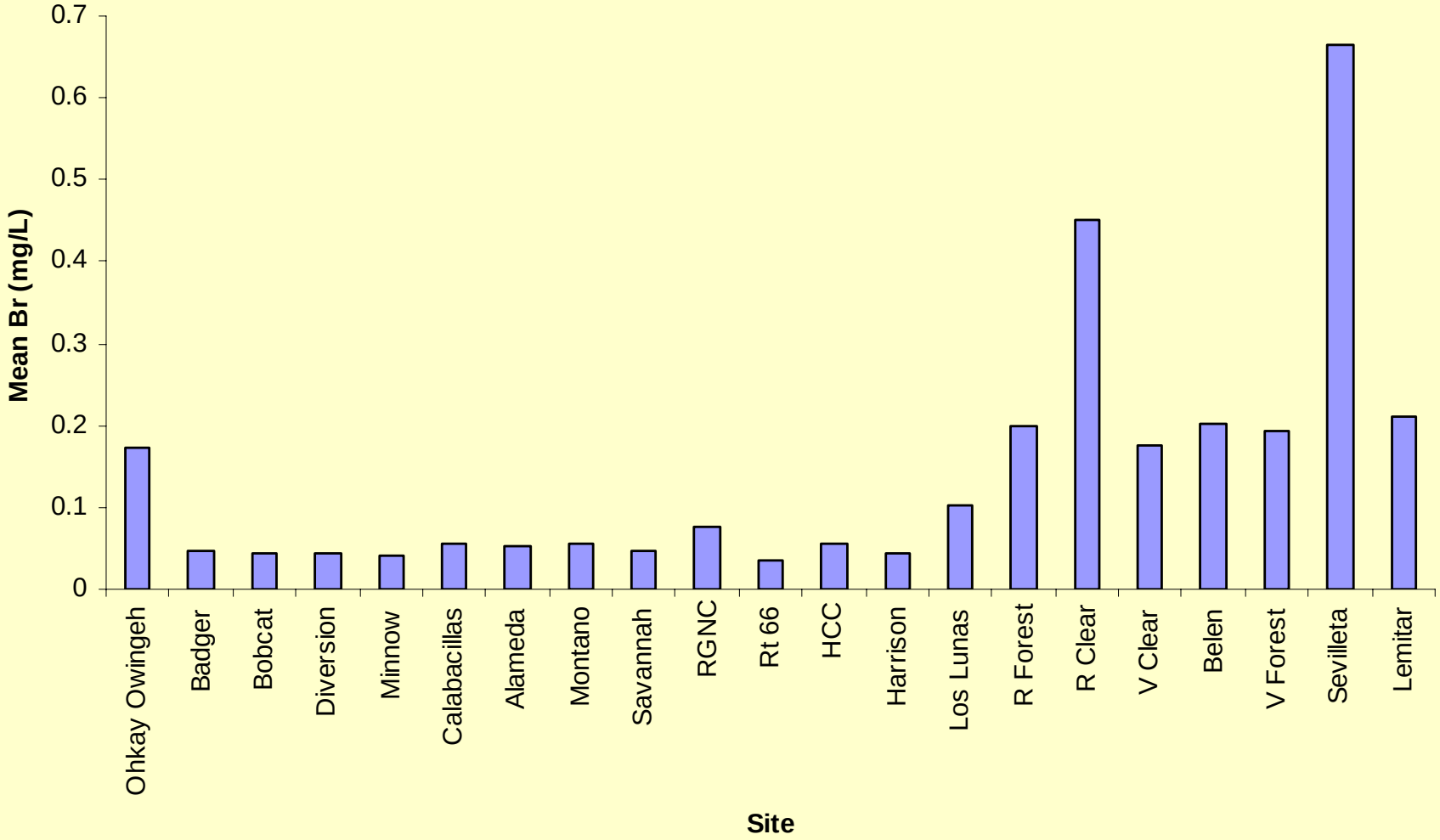
Groundwater Sulfate 2/06



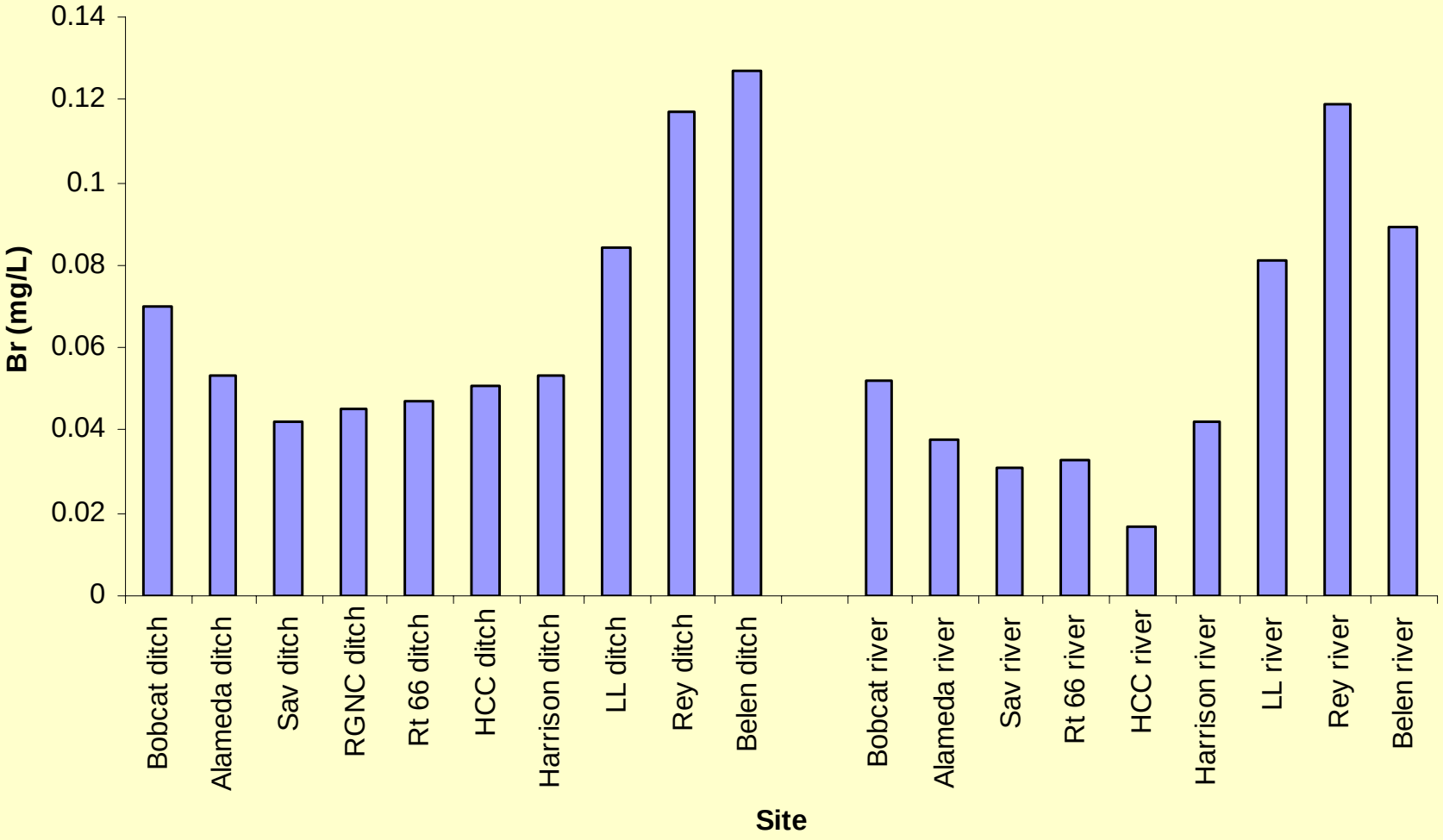
Surface Water Sulfate 2/06



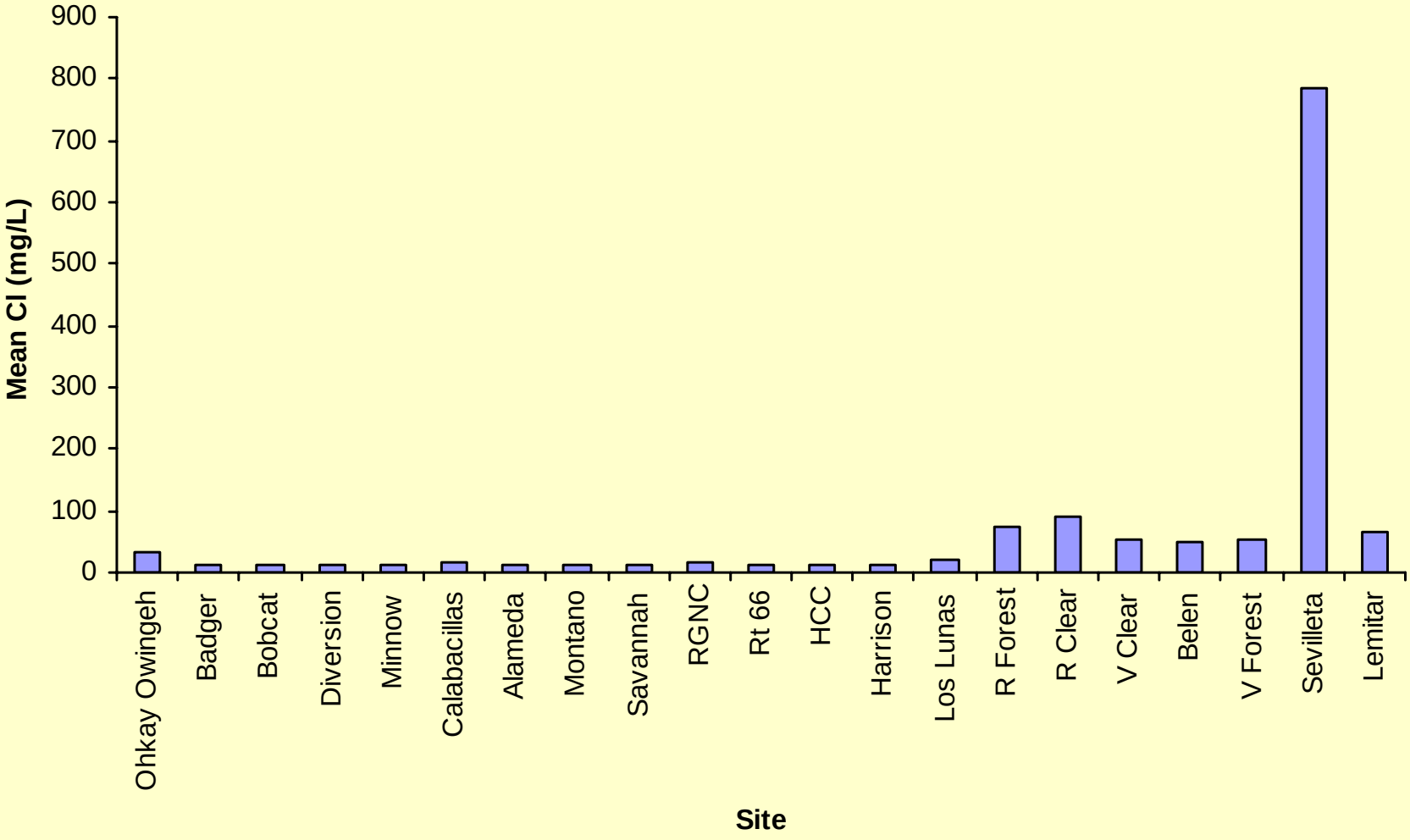
Groundwater Bromide 11/05



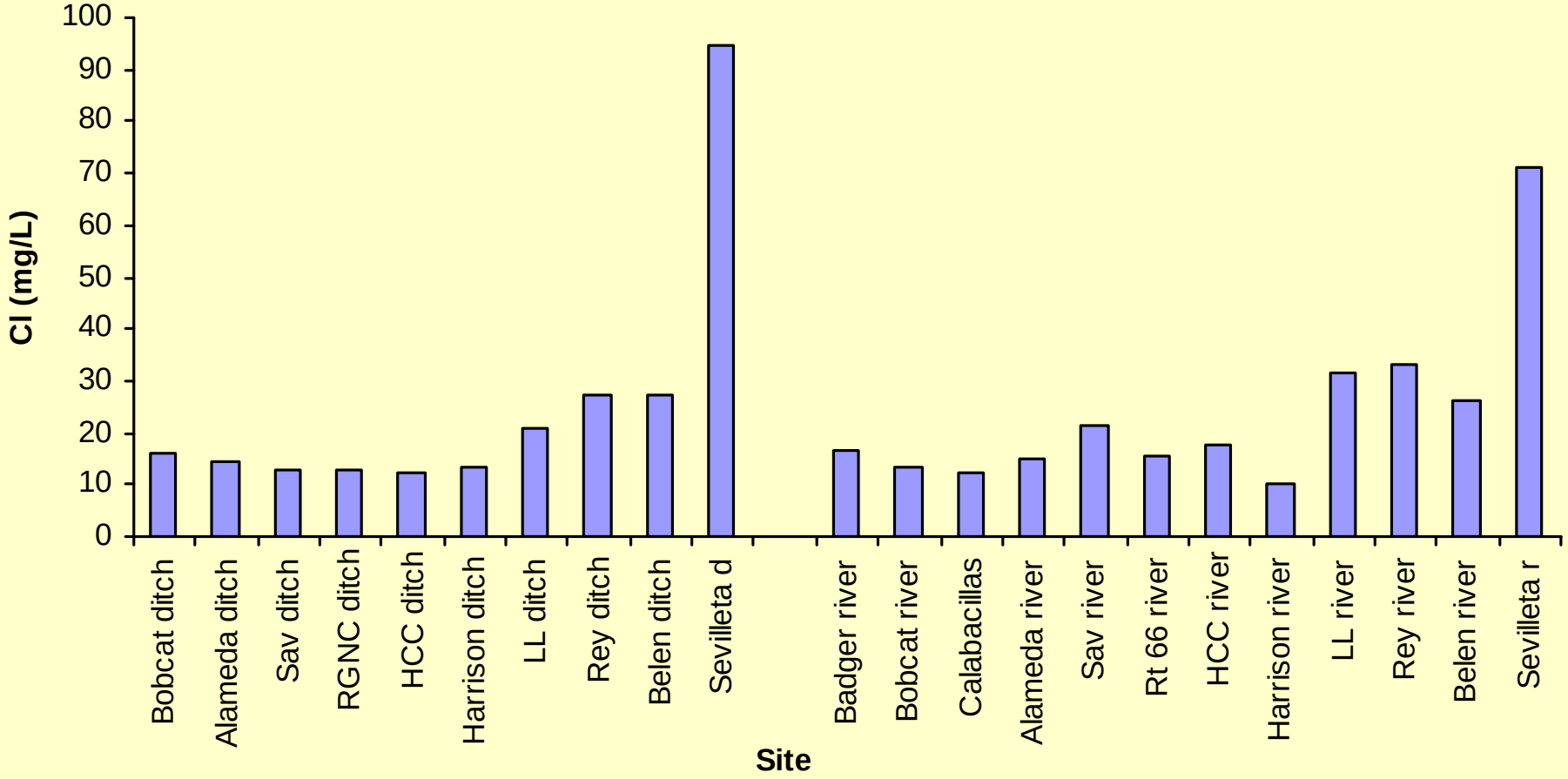
Surface Water Bromide 11/05



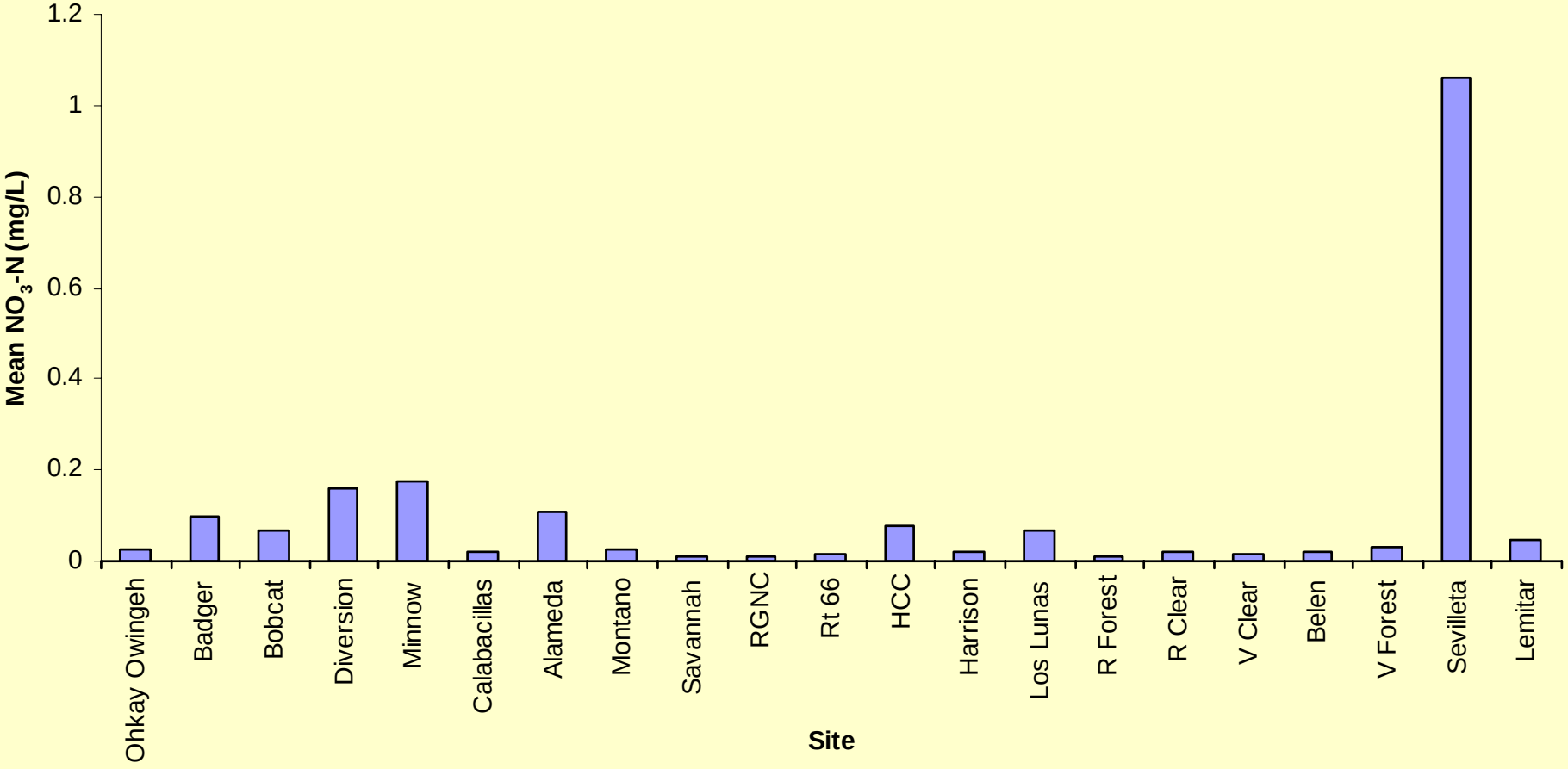
Groundwater Chloride 2/06



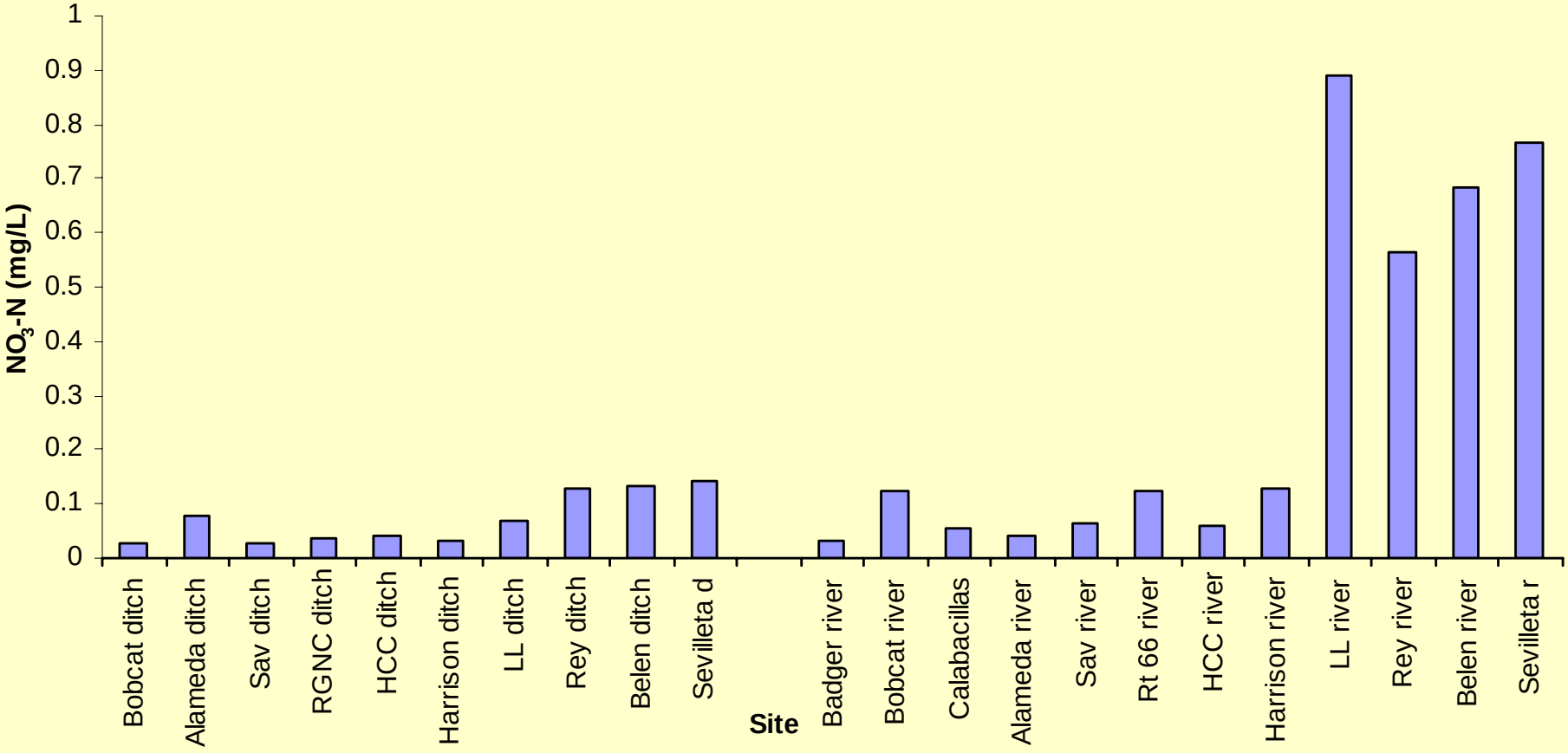
Surface Water Chloride 2/06



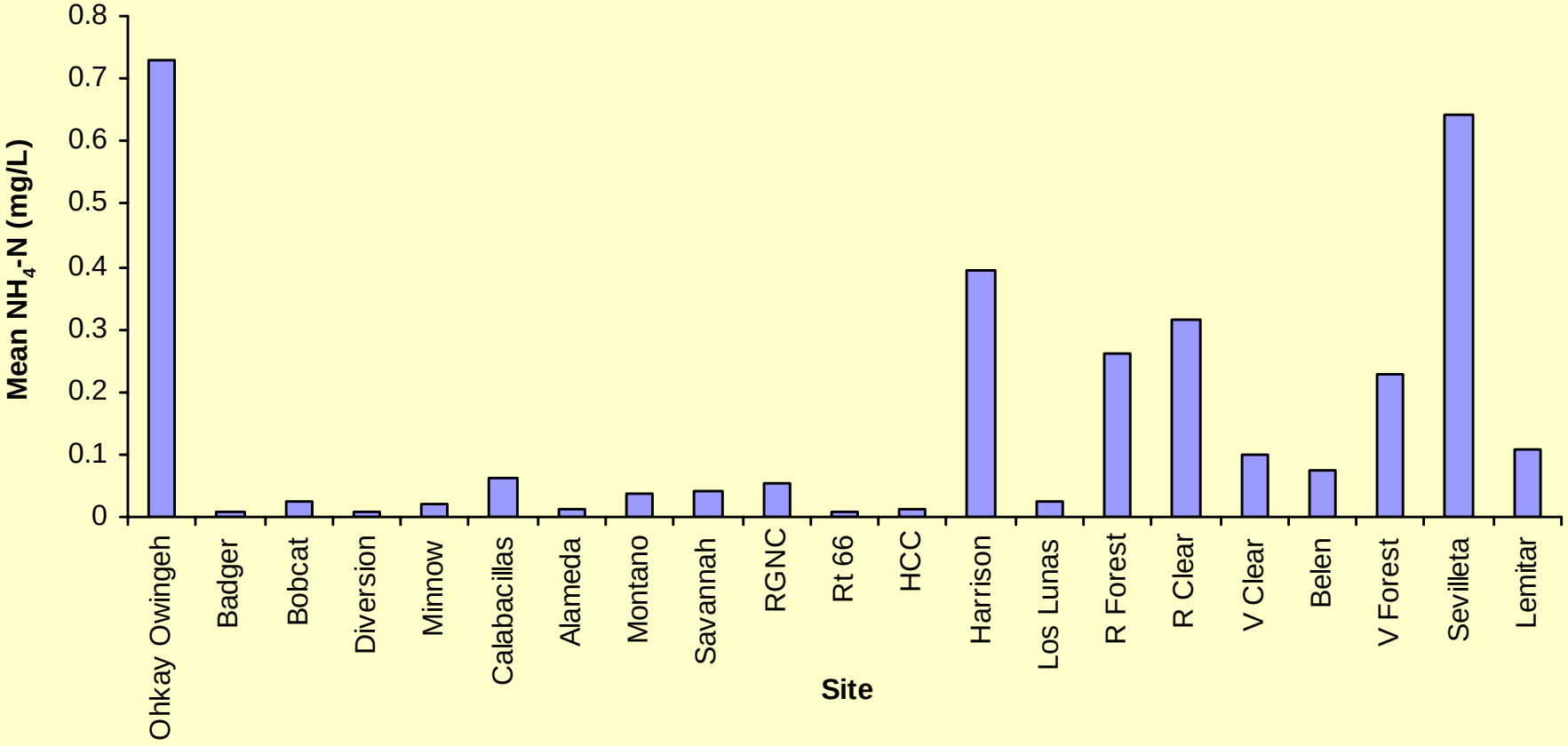
Groundwater Nitrate 2/06



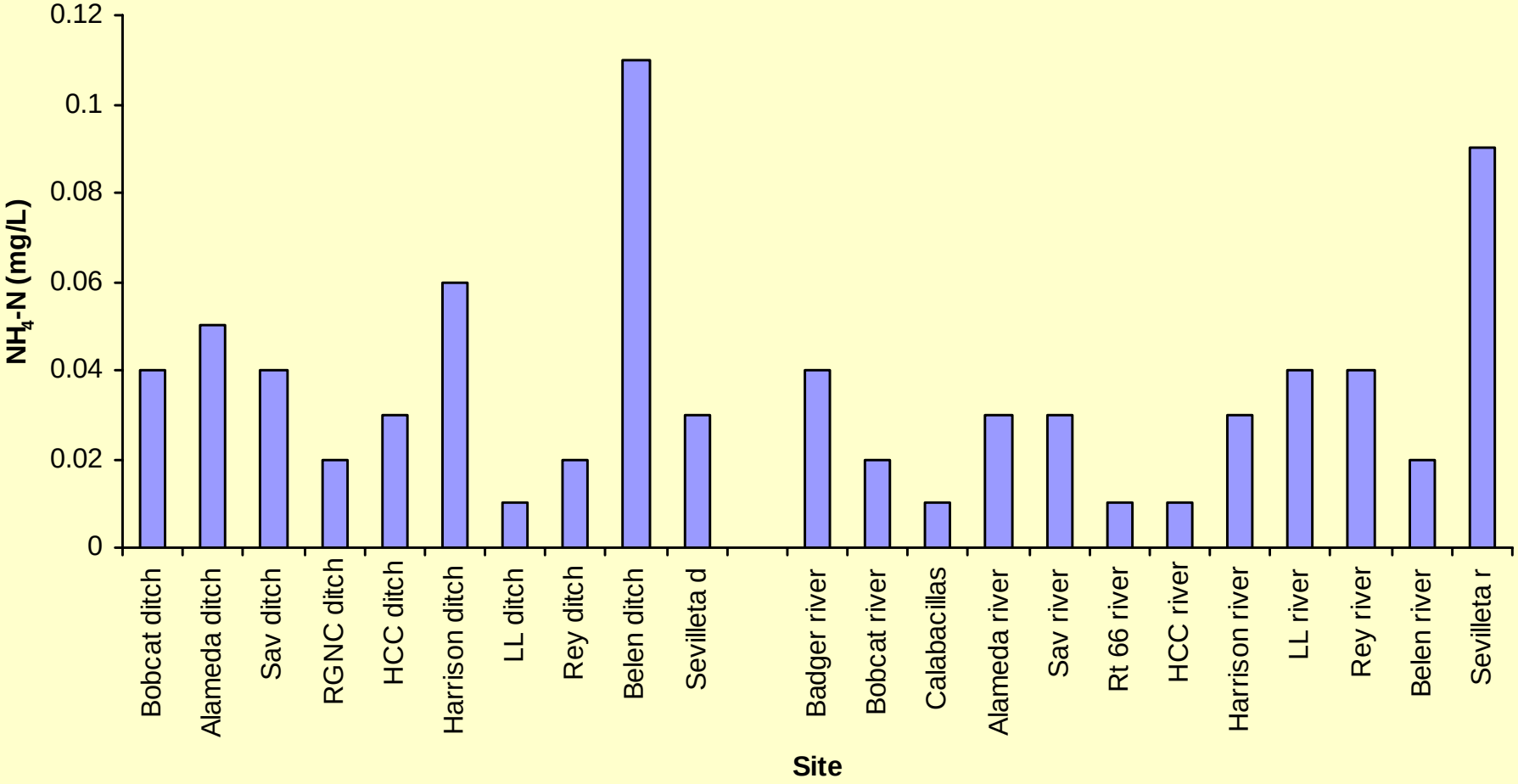
Surface Water Nitrate 2/06



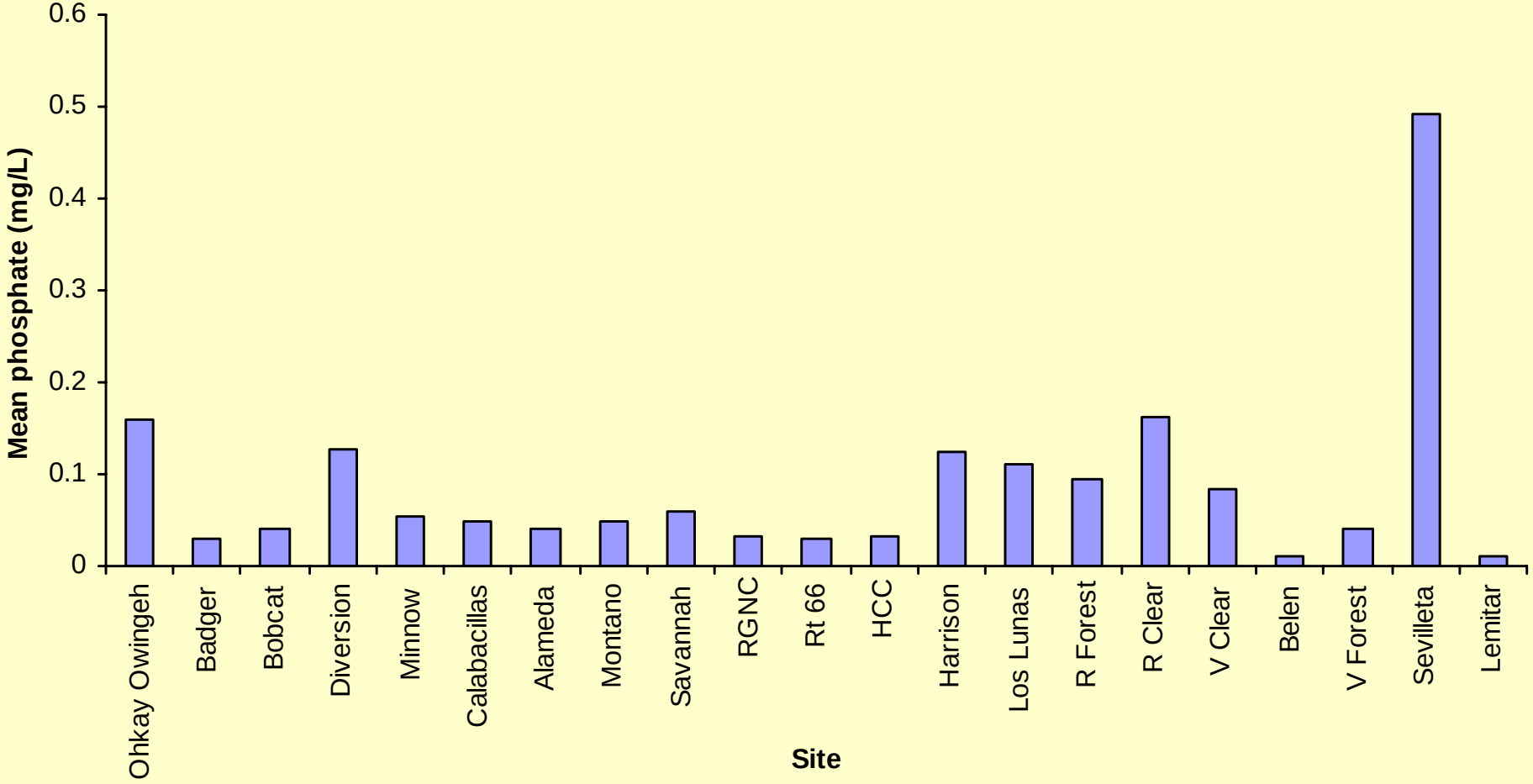
Groundwater Ammonium 2/06



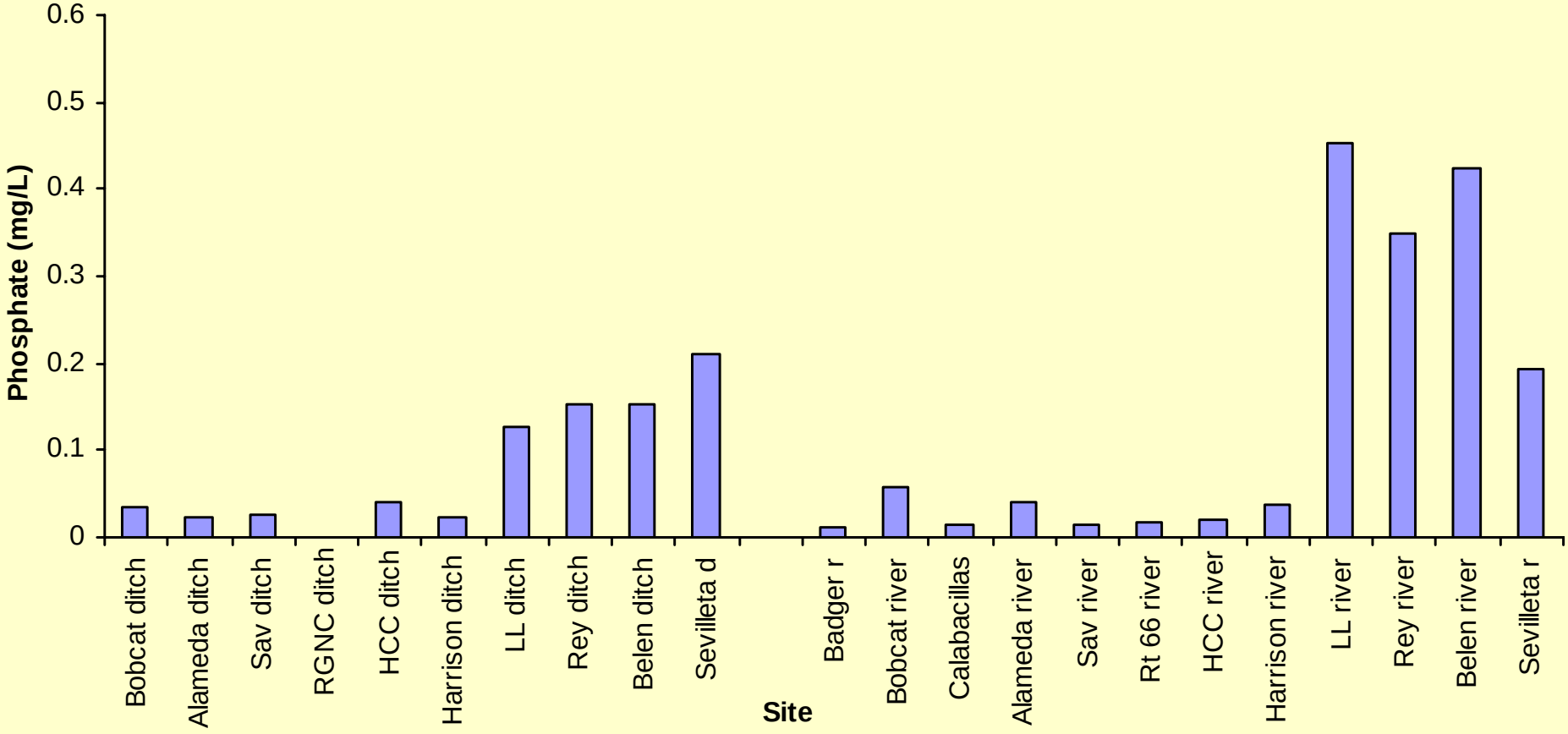
Surface Water Ammonium 2/06



Groundwater Phosphate 2/06



Surface Water Phosphate 2/06



Conclusions

- Sevilleta has high levels of nitrate, ammonium, phosphate, sulfate, chloride, bromide, and specific conductance (due to underlying thermal vents)
- Specific conductance, sulfate, bromide, and chloride show similar trends of increasing from north to south, past Albuquerque for GW & SW
- Phosphate follows this trend except high values start at Harrison, 1 mile north of waste water treatment plant. Also RGNC and Diversion have had spikes
- Harrison also has a GW spike in ammonium, as does Ohkay Owingeh
- Turbidity levels are high at Ohkay Owingeh and Montano (post-burn sites) and at Diversion (2/06) when all wells but one were dry
- DO levels were elevated at sites on the east side of the river above & below the drinking water diversion dam (with corresponding drops in groundwater levels at sites below the dam) and an increase in one site below the dam on the west side of the river
- All data available at www.bosqueschool.org

Acknowledgements

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- Sevilleta Long Term Ecological Research Schoolyard Program
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- Middle Rio Grande Conservancy District
- The Rio Grande Nature Center
- City of Albuquerque Open Space
- State of New Mexico
- Pueblos of Santa Ana and San Juan
- U.S. Bureau of Land Management
- National Hispanic Cultural Center
- All schools, site representatives, and students involved with BEMP