

# **Bosque Ecosystem Monitoring Program (BEMP) Overview**



**Dr. Cliff Crawford – Director**

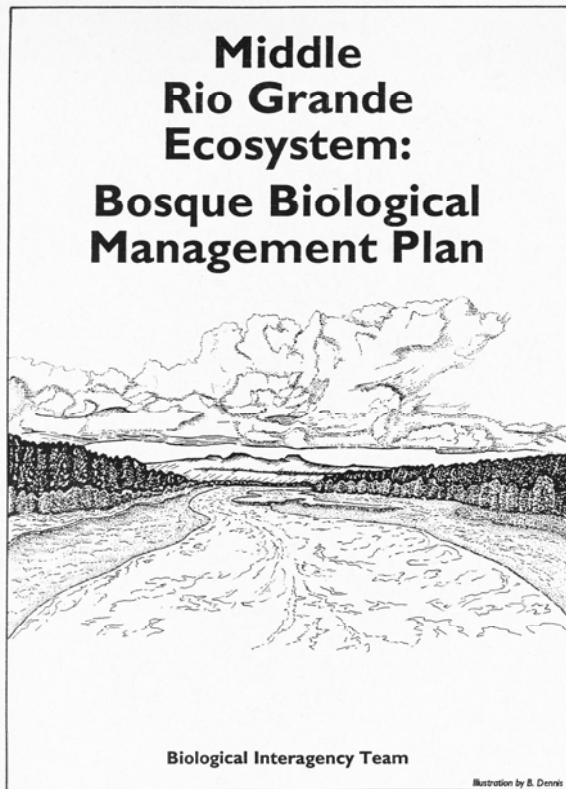
**Dr. Kim Eichhorst –Data Manager**

**Jen Schuetz – Field Coordinator**

**Kim Scheerer – Education Coordinator**

**Dan Shaw – BEMP Coordinator**

# Bosque Biological Management Plan

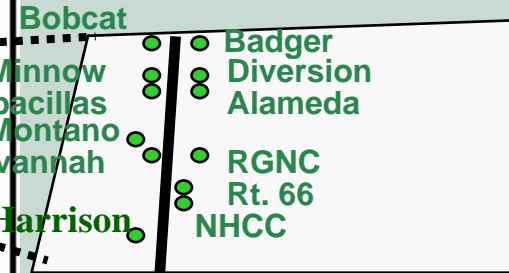
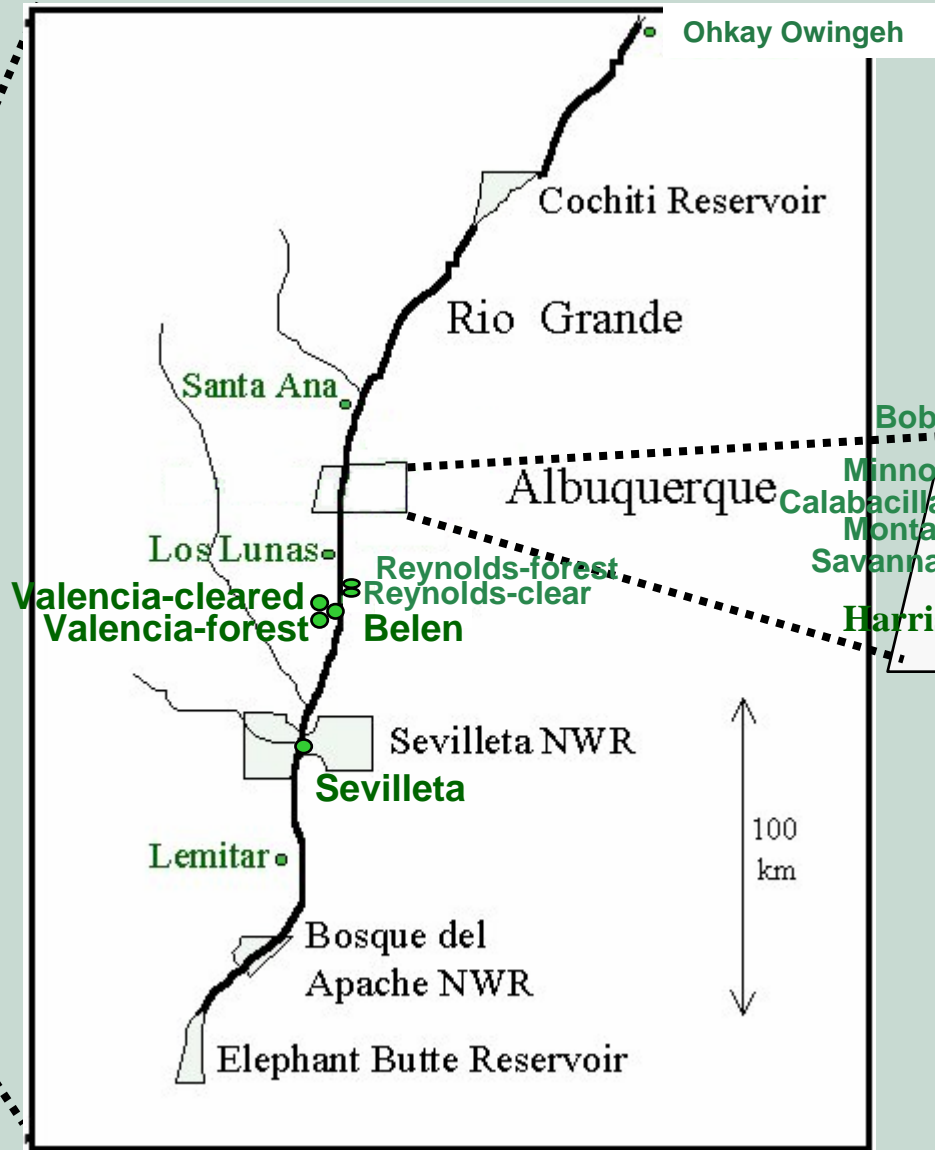


- published in October 1993
- joint effort of authors included: Cliff Crawford (UNM), Anne Cully (U.S. Fish & Wildlife Service), Rob Leutheuser (U.S. Bureau of Reclamation), Mark Sifuentes (U.S. Army Corps of Engineers), James Knight (N.M. State University)
- covered: climate, geology, historical conditions, existing conditions, future conditions and recommendations (to enhance biological quality and ecosystem integrity)
- recommendation 18: develop a coordinated program to monitor biological quality and ecosystem integrity of the Middle Rio Grande ecosystem (monitoring & research)

# **BEMP Mission Statement**

BEMP's mission is collaborative long-term ecological monitoring of key abiotic and biotic processes and characteristics to promote continued education, understanding, and stewardship of the riparian ecosystem to scientists, teachers, students, policy makers and the public.

# BEMP Sites



## 22 sites

Plus 2 new sites under construction, spring 2007:

1. Willow Creek
2. Biopark

Alameda



Rio Grande Nature Center



Los Lunas



Belen



Santa Ana



Lemitar



Savannah



Hispanic Cultural Center





Ohkay  
Owingeh

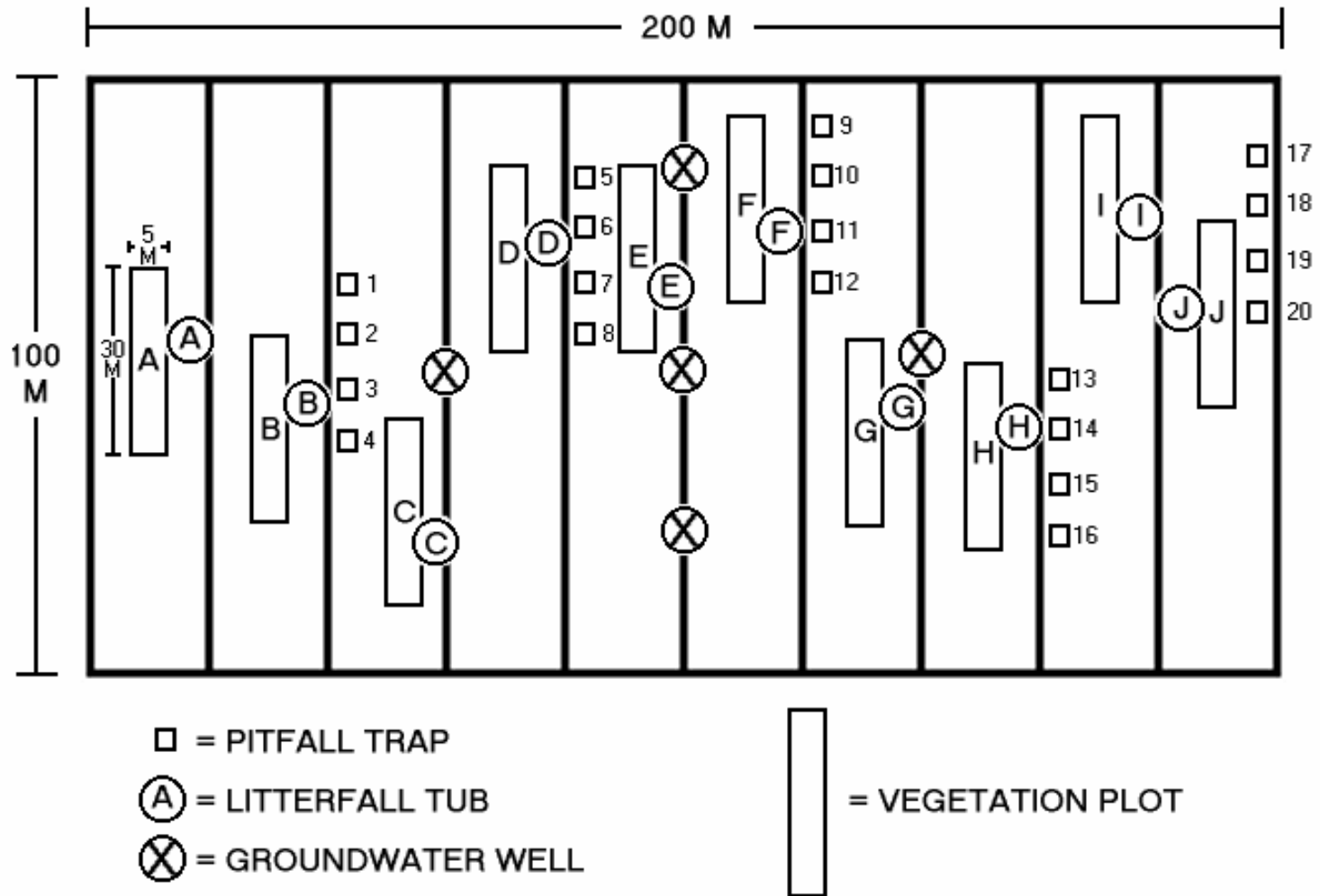


Valencia Cleared

Valencia Forest



# Typical Site Layout



\*\* plus 2 precipitation gauges & data loggers \*\*

# Site Setup

Set Line Transects



Install Wells



Dig in Pitfall Traps

# Monthly Monitoring

Wells



Rain Gauges

Litterfall Tubs



Ditch/Drain



# Pitfall Traps



May  
June/July  
August



# Spring Cottonwood Monitoring

Determining Tree Sex



Tree Diameter at Breast Height



# Fall Vegetation Transects

Laying Transects



Identifying Plant Species

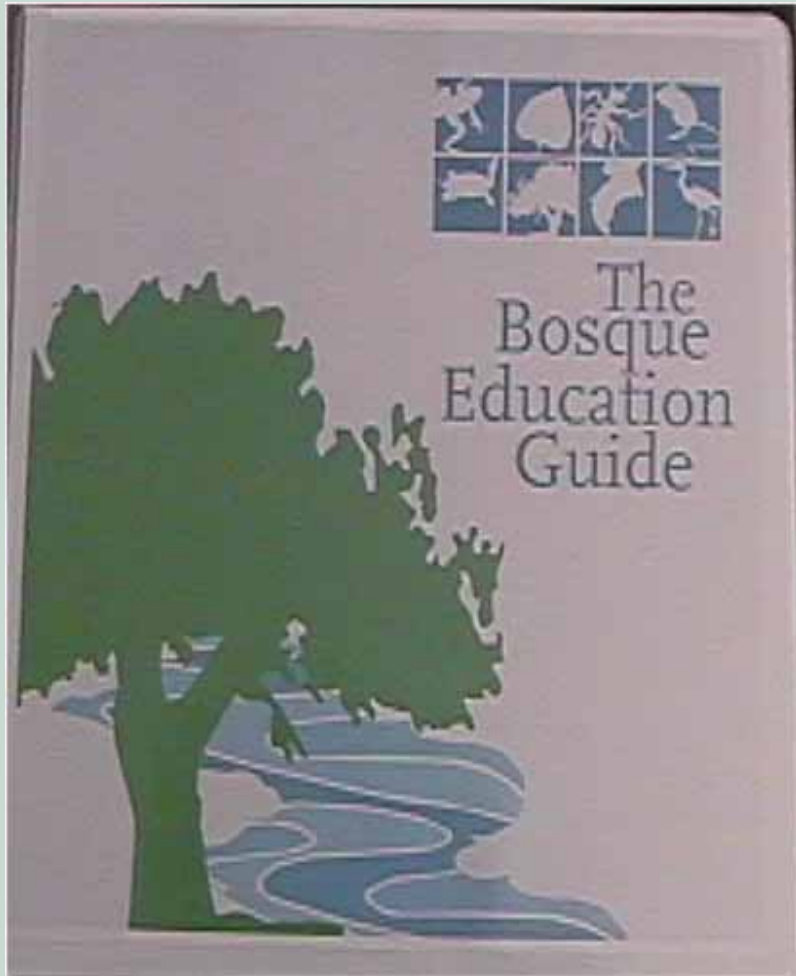
# Woody Debris / Fuel Load



# Water Chemistry



# Teacher Workshop



## **Train teachers to:**

- collect data in field
- process data in lab
- use data in classroom
- other field projects
- using BEMP & BEG to teach science, math, & social studies

# Environmental Education - Outreach



In the Field

In the Classroom



# National Educational Standards

- BEMP meets national science standards for K-12
- AAAS benchmarks for science and literacy
- consistent with national science education standards (actual research and relationship with university researchers)
- In addition to core responsibilities of BEMP, students have opportunities for advanced research

# Bosque Education Guide

## Changing River Model

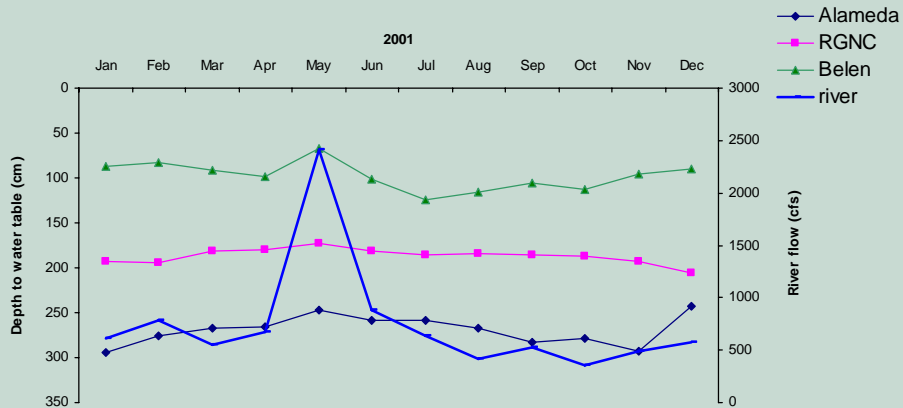


- grades: K-12, university
- activity: build models of historic river, today's river, and tomorrow's managed river systems
- subjects: science, social studies, geography, visual arts
- NM state education standards: science (K-12), social studies (K-12), geography (9-12), visual arts (5-8)

# Water Table Depth

		Alameda	Nature Center	Belen	Rio Grande
<u>year</u>	<u>month</u>	<u>wells</u>	<u>wells</u>	<u>wells</u>	<u>discharge</u>
2001	Jan	294.1	193.5	87.4	616
	Feb	275.2	194.5	82.4	782
	Mar	267	181.6	90.8	549
	Apr	265.3	179.8	98.8	676
	May	247.4	172.4	67.6	2410
	Jun	258.1	181.2	101.6	881
	Jul	258.5	185.2	124.6	633
	Aug	267	184.8	115.2	412
	Sep	283.1	185.8	105.6	523
	Oct	278.5	187.5	113.4	356
	Nov	292.4	193.1	95.4	485
	Dec	243.4	205.4	89.4	572

- grades: K-12, university
- activity: monitor river & groundwater; graph & analyze data to determine connectivity and necessary depth of plant roots
- subjects: science, math
- NM state education standards: science (5-12), math (5-12)



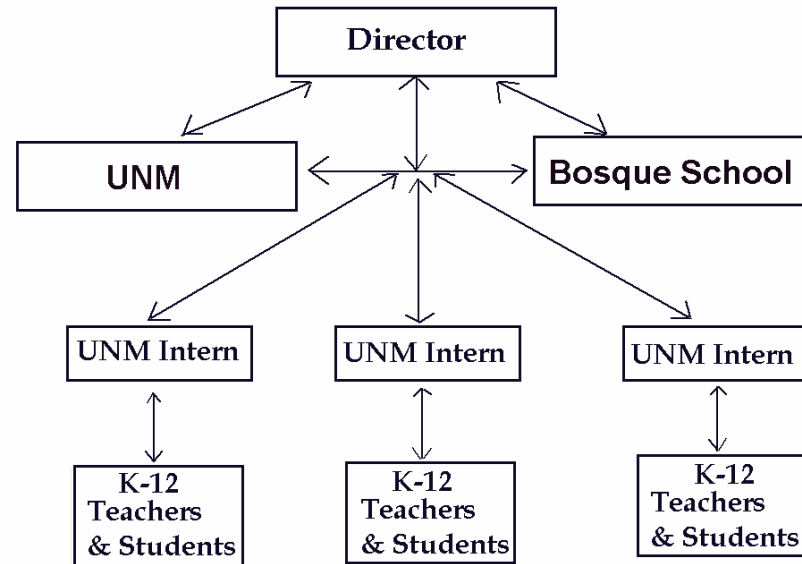
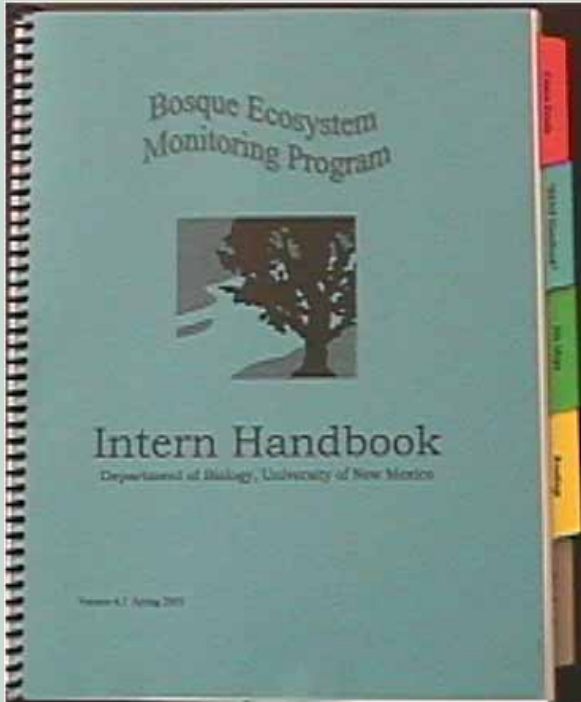
# Litterfall Collection & Sorting



- grades: K-12, university
- activity: collect plant litter from tubs; identify, separate & weigh wood, reproductive parts and leaves of different species; graph data
- subjects: science, math
- NM state educational standards: science (K-12), math (K-8)

# UNM BEMP Intern Course

## BEMP INFRASTRUCTURE



- interns provide a link between students in the field and the UNM Biology Department
- interns learn about the biological and educational aspects of BEMP

# BEMP Spring Student Congress



- students from all classes (K-12) from the different participating schools present to each other what they've learned through BEMP or related projects
- presentations are made to students by BEMP staff and interested agencies
- Bosque School students lead tour of Savannah BEMP site to schools from different BEMP sites

# BEMP Data

- data collected by students are quality controlled and valid
- datasets have been requested and used by:
  - the Middle Rio Grande Conservancy District
  - City of Albuquerque Open Space
  - Army Corps of Engineers
  - Fish & Wildlife Service
  - Bosque Education Guide, and
  - scientists working on the bosque

# Conclusions

- as a long-term monitoring program along the Middle Rio Grande, BEMP is a fundamental building block for our understanding of the bosque
- BEMP is a strong environmental education and far-reaching community outreach program, involving over 2500+ K-12 & university students in 2005
- BEMP data are quality controlled and valid, making them useful to anyone interested in learning about or managing this system

# Acknowledgements

- National Science Foundation
- Sevilleta Long Term Ecological Research Schoolyard Program
- Bosque School (Andrew Wooden, Ray Graham III, Black family)
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service – Middle Rio Grande Bosque Initiative
- Middle Rio Grande Conservancy District
- The Rio Grande Nature Center & City of Albuquerque Open Space
- Bernalillo County & Sandoval County
- State of New Mexico
- Pueblos of Santa Ana and Ohkay Owingeh
- U.S. Bureau of Land Management
- National Hispanic Cultural Center
- Valencia Soil and Water Conservation District
- all schools, site representatives, and students involved with BEMP

