



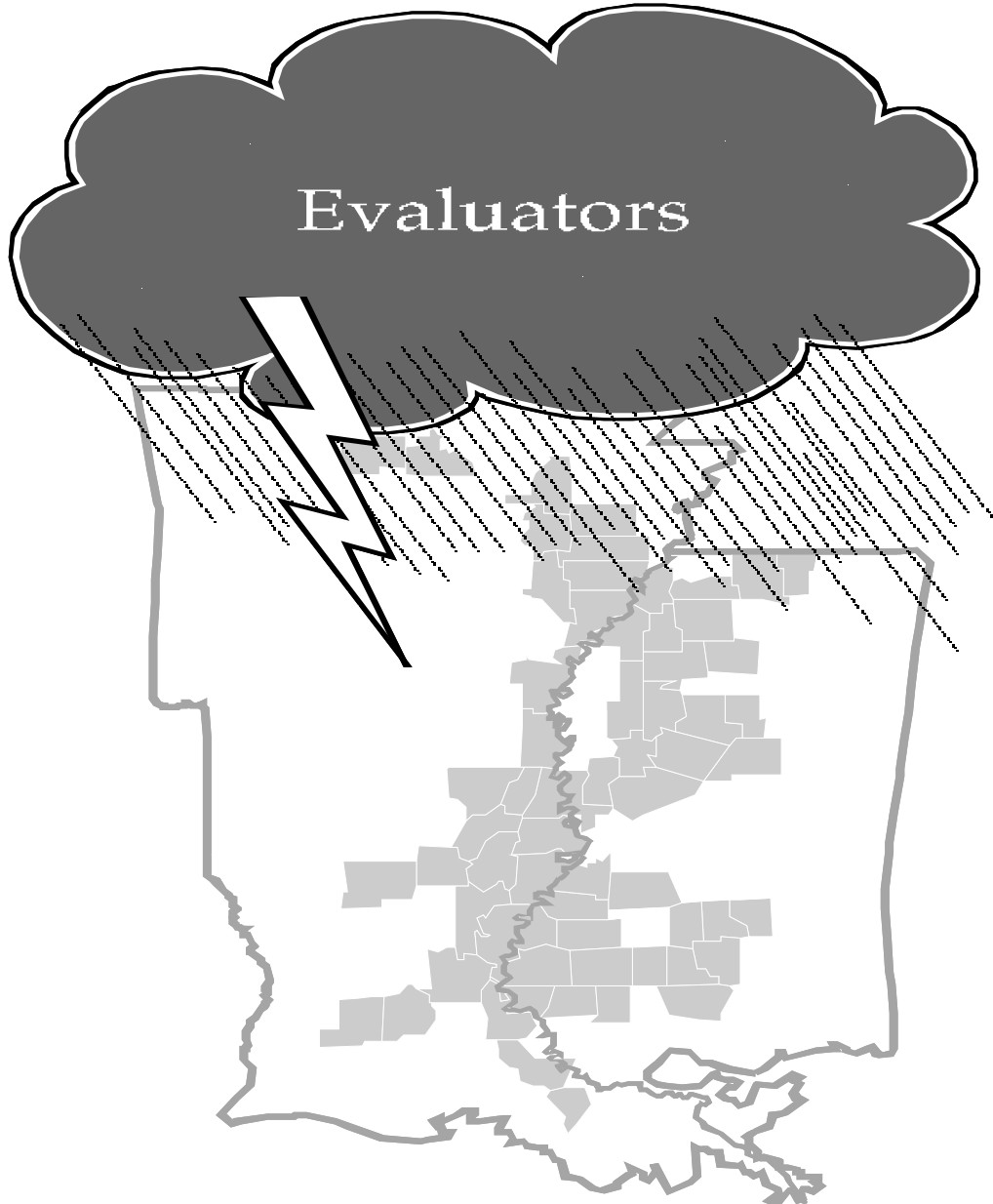
# What can we learn about evaluation from our colleagues?

National NSF EPSCoR Meeting  
November 8, 2007

New Mexico EPSCoR Program Evaluator  
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Minnick & Associates, Inc.



You May See Us as . . .



## FABLE OF THE BLIND MEN AND THE ELEPHANT

- The 1st felt the elephant's trunk and determined it was a snake.
- The 2nd felt the elephant's tusk and thought it like a spear.
- The 3rd put his arms around a leg and said an elephant is a mighty tree.
- The 4th grabbed the elephant's tail and said it was a very smelly rope.

Finally, an old blind man came by to see what all the fuss was about. He walked all around the elephant, and using all his senses determined he did not know what it was, but he knew more about the elephant than the rest because he knew what it was not.



What is the lesson we learn from the fable?

- A. Evaluators need to be old & blind.
- B. Evaluation is more art than science.
- C. “You can observe a lot by watching.”
- D. Determining what something is not, is still knowledge.
- E. Evaluation requires multiple assessments and triangulation of data



# Reinventing the wheel: Not

- Try not to reinvent how you will assess and evaluate your project
- Good resources at NSF and elsewhere
  - User-Friendly Handbook for Project Evaluation
  - W.K. Kellogg Foundation: Logic Model Development Guide
  - NSF WEBCASPAR data



# Experiences of Other Programs

- NSF has always used evaluation to inform funding decisions and support awardees
- CRCM, RSI and CETP initiatives
- Use of baselines and change metrics
- Common core set of data
- Support for project evaluators to share ideas and learn from each other
- Reverse Site Visits



# Formative Evaluation

- Implementation
  - Project being conducted as planned?
  - Appropriate staff hired?
  - Activities being conducted as proposed?
- Progress evaluation
  - Project moving towards goals?
  - Which activities are working?



# Summative Evaluation

- Was project successful?
- Project met overall goals?
- Components most successful?
- Was project worth the cost?
- Did participants benefit from project?
- What were the macro level impacts?



# Evaluation process

- Develop evaluation questions
- Identify data to answer questions
- Collect data
- Analyze data
- Report data

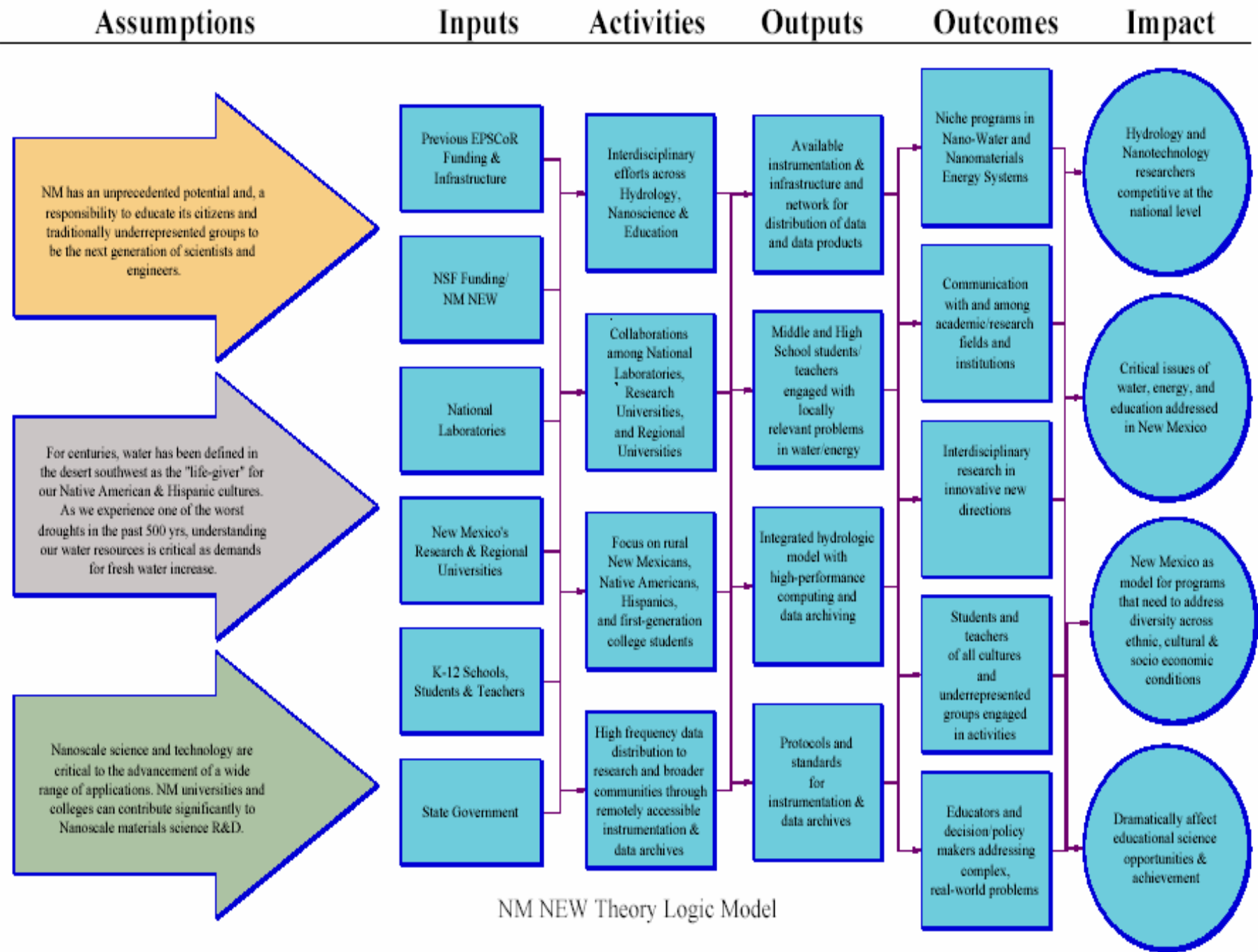




# Evaluation Questions

- Based on program goals and objectives
- Identify your audience: NSF, state legislators, university administrators, public, etc.
- Determine the information needed to answer questions of your audiences
- Questions need to be measurable
- Determine resources available & prioritize





NM NEW Theory Logic Model

# Outputs, Outcomes & Impacts

- Output – # of teachers reached, # of publications, # of patents, # of REU
- Outcome – teachers change instruction, publication impacting field, patent influencing science, students becoming STEM majors
- Impact – more diverse workforce, new scientific discoveries, life saving research, more underrepresented STEM researchers





# Evidence or Metrics

PROJECT OBJECTIVES: (in the theme area)	ACTIVITIES:	EVIDENCE:	OVERALL OUTCOMES:
<p><b>Advance cutting-edge science and engineering capabilities</b> for discovery and innovation in this focus area in order for Maine's academic, non-profit, and for-profit R&amp;D community to:</p> <ul style="list-style-type: none"> <li>a) increase research capabilities</li> <li>b) increase competitiveness &amp; federal funding</li> <li>c) acquire new technical skills &amp; knowledge</li> <li>d) develop new collaborations</li> </ul>	<ul style="list-style-type: none"> <li>• create the Forest Bioproducts Research Institute (FBRI) at the University of Maine, bringing together statewide researchers from up to 13 different disciplines to address the focus area.</li> <li>• examine three scientific theme areas: 1) forest bioproducts sustainability, 2) extraction and residual solids control, and 3) separation and conversion to new products.</li> <li>• also utilize the cross-focus areas of bioprocessing, surfaces and nanotechnology, computational chemistry, and resource modeling in the R&amp;D focus</li> </ul>	<ul style="list-style-type: none"> <li>• # grant submissions, awards, and funding levels</li> <li>• multi-departmental/multi-disciplinary/ multi-institutional research</li> <li>• involvement of undergraduate institutions in corollary research</li> <li>• quality and results of research</li> <li>• # cited works, peer-reviewed publications</li> <li>• national visibility and participation (review panels, boards, etc.)</li> <li>• awards, prizes, recognitions, etc.</li> <li>• hosted events (conferences, workshops, etc.)</li> <li>• # &amp; level of federal awards funded</li> </ul>	<ul style="list-style-type: none"> <li>• Provide the basic research to create the next generation of industrial and consumer products that will efficiently utilize our forest resources and lessen our dependence on petroleum resources (i.e. by finding functional substitutes for products that are currently made from oil, such as containers, adhesives, coatings, etc.).</li> <li>• Create opportunities to help transform the current forest-based industry in the state into globally competitive biorefineries that can utilize forest-based products in a more efficient, higher value manner that is also environmentally cleaner (saving and creating jobs).</li> <li>• Maximize the efficient and wise use of forest acreage in the state through a holistic approach that takes all stakeholder concerns into consideration.</li> </ul>

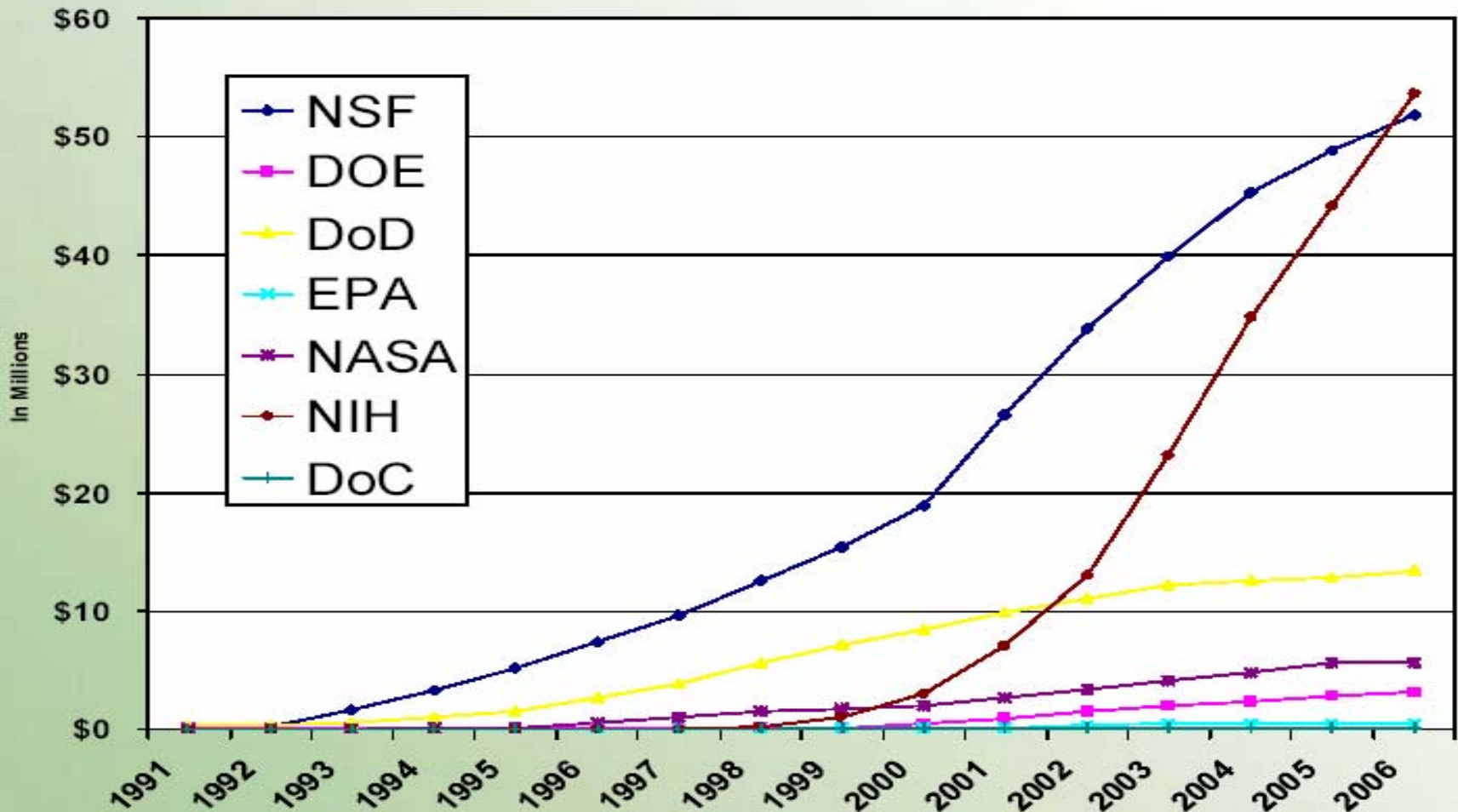
# Need to Collect and Store Data

- NM adapted Idaho's web based data system which has simplified collecting and storing data:
  - Participation (faculty, undergrads, grads, etc)
  - Research production (papers, awards, patents, etc)
  - Research investments (equipment, technology etc.)
  - Collaboration and Networking
  - Follow-up and tracking





# Longitudinal Comparisons



*Cumulative Federal R&D funds expended by Nebraska EPSCoR*

# Baselines and Comparison Groups

Academic R&D Obligations for Science/Engr. - in thousands					
	2000	2001	2002	2003	2004
<b>Kentucky</b>	\$138,450	\$166,094	\$192,050	\$217,601	\$228,656
<b>National Average</b>	\$392,190	\$443,408	\$481,804	\$526,488	\$539,976
<b>EPSCoR States Average</b>	\$100,634	\$116,155	\$130,055	\$142,172	\$143,337

<http://www.nsf.gov/statistics/nsf07316/tables/tab3.xls>

[PDF Version of tab3.xls](#)

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions, FY 2004.



# Qualitative Data

- Primarily descriptive and interpretive
- Able to better understand a process
- Limited in ability to generalize
- More than simply a story
- Useful for understanding the “how” and “why” of quantitative outcomes



# Case Study

- NM RII1 supported NM Hispanic faculty member in Nano/Bio Engineering
- NM RII2 helped fund start-up package for two more Bio Engineering faculty
- Faculty formed Center for Biomedical Engineering
- Submitted and were awarded \$2.5m for NSF Partnership for Research and Education in Materials (PREM) with Harvard



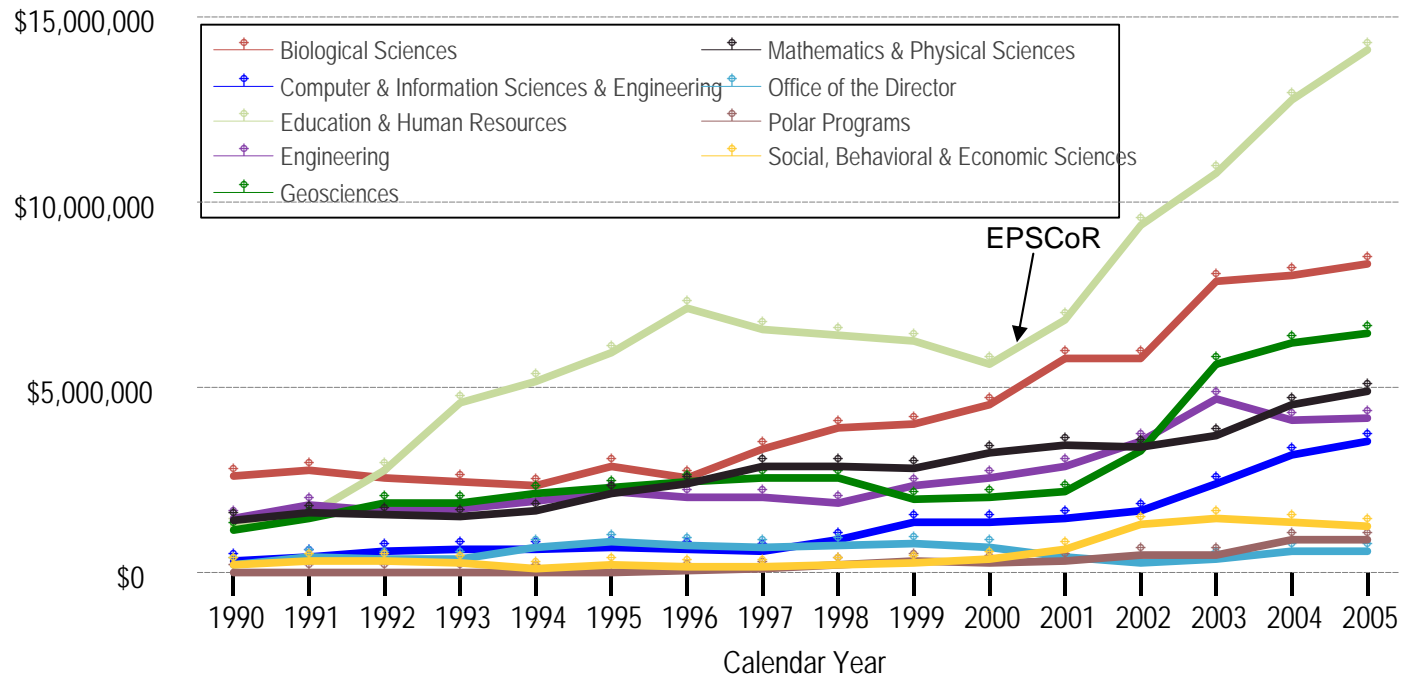
# Secondary Data Sources

- [NSF Award Search](#)
- [NSF Budget Internet Information System](#)
- [NSF WebCASPAR](#)
- [NSF Division of Science Resources Statistics](#)
- [US Patent Office](#)
- [NCES National Assessment of Educational Progress](#)





# NSF Funding to NM



Source: NSF Active & Expired Awardee Information ([www.nsf.gov/awardsearch](http://www.nsf.gov/awardsearch))



# Closing Remarks

- Test beds for new strategies require the application of evaluation and assessment
- Use existing data sources when available
- Strive to embed data collection
- Minimize data requests to research faculty
- Include evaluator from beginning in developing goals, objectives & metrics

