Report on 2005 Survey of Superfund Basic Research Program Activities at Hazardous Waste Sites

Justin Crane, Larry Reed, and Maureen Avakian
January 2006

MDB, Inc.

1250 Connecticut Ave, NW, Suite 610 Washington, DC 20036 | (t) 202.331.0060 (f) 202.331.0044
2530 Meridian Parkway, Suite 300 Durham, NC 27713 | (f) 919.806.4301
www.michaeldbaker.com
info@michaeldbaker.com

Purposes of Study

- To better characterize the site-specific research support that Superfund Basic Research Program (SBRP) programs have provided to EPA and other hazardous waste clean up programs.
- To evaluate how SBRP programs may be able to better support site application of their research in the future.

This project attempts to answer the following questions:

- What have SBRP researchers provided to EPA and other agencies or communities at specific sites?
- How have these products and services provided by SBRP researchers been used by EPA and other Agencies and communities?
- What factors contributed to the ability of SBRP researchers to transmit products or services to EPA or other Agencies and communities? What factors contributed to the utility of the products or services transmitted?
- What actions can SBRP take to further (i) awareness of researchers of the importance of transmitting their work; (ii) the effectiveness of transmission of the work; and (iii) the ability of relevant decision-makers to apply that work?

Methodology

- Questionnaire development
- Pilot test
- Modifications
- Distribution/collection
- Analysis - responses are in an MS Excel spreadsheet allowing review by researcher, site, question etc.
- Presentation

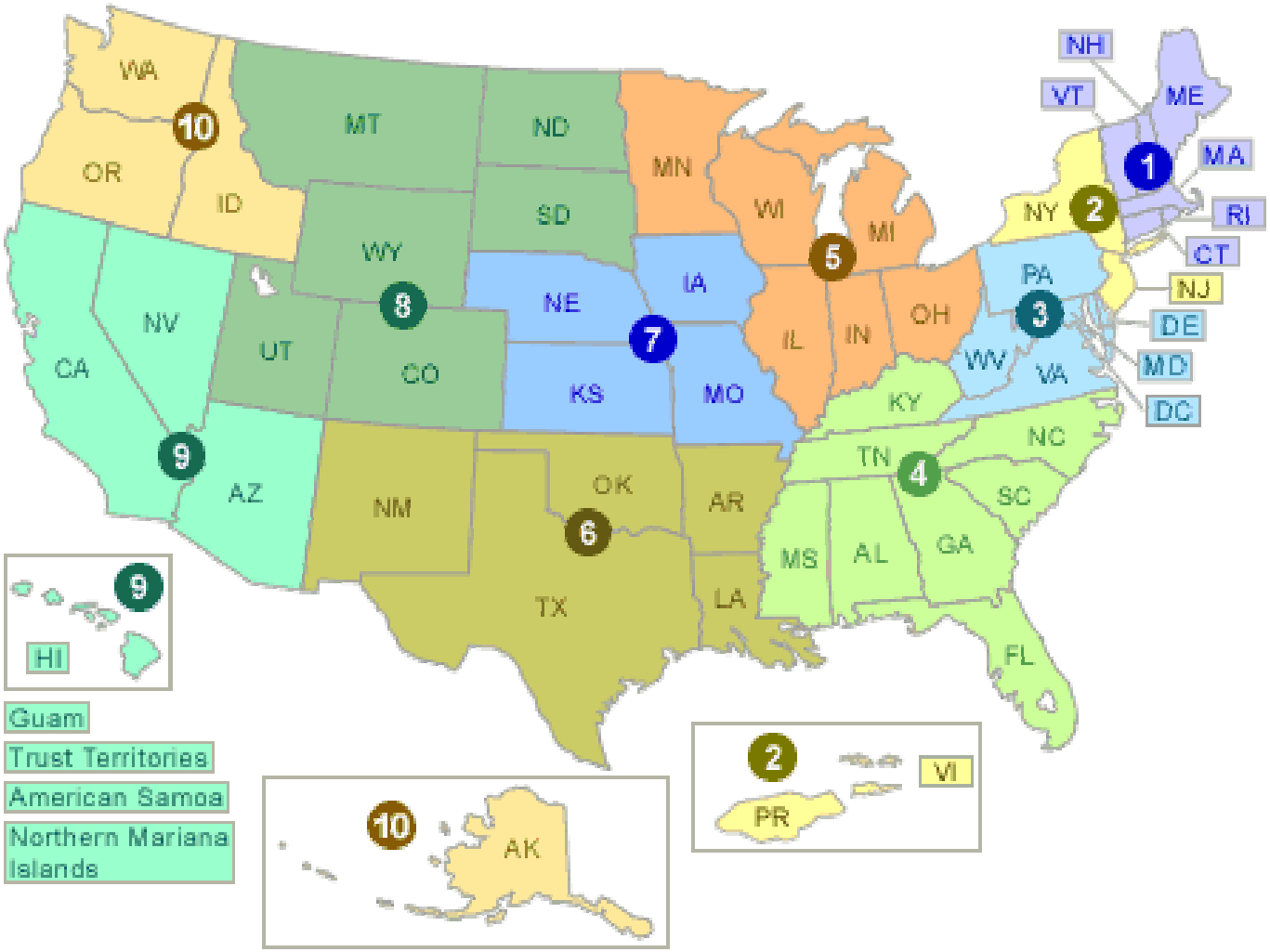
Please note:

- All of the data reported in this presentation was collected from Project Investigators who were going above and beyond what was expected of them. None of the “extracurricular” activities that are being highlighted here were required of the researchers.
- Under reporting effects all the data that is presented here, this presentation gives a sample of the activities that are taking place with University based SBRP programs and should not be seen as the full level of activities taking place at hazardous waste sites.

Statistics

- 201 questionnaires sent to 59 people
- 107 (53%) questionnaires returned from 28 (47%) people who did work at a hazardous waste site
- Response rate was not 100%, therefore the following data probably undercount SBRP site activity, i.e. under reporting affects all the following results
- Some site data are confidential at the request of the site manager

Involvement by EPA Region

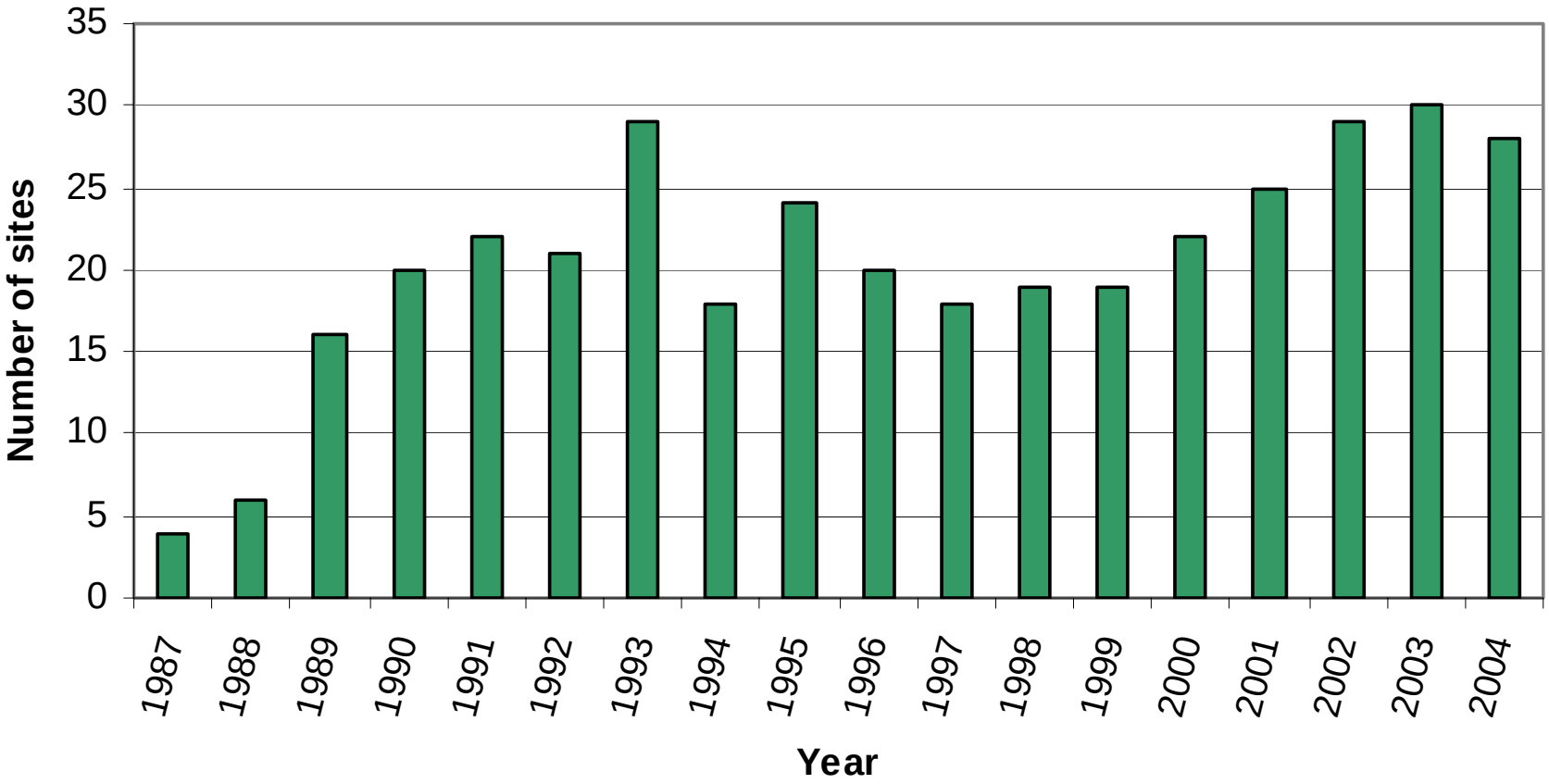


EPA Region	# of sites	
	surveyed	actual*
1	8	38
2	1	17
3	5	12
4	11	21
5	24	27
6	17	19
7	1	2
8	6	8
9	22	51
10	9	25
Total	104	220

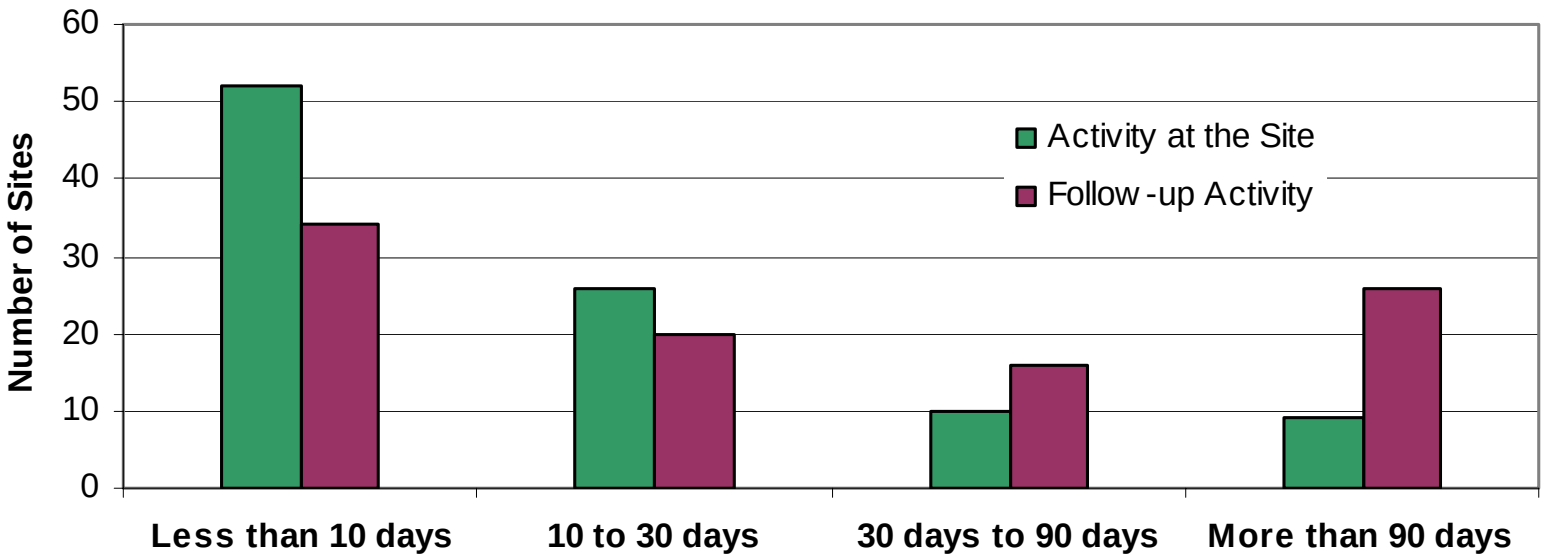
*based on sites listed on the SBRP website

Map source: http://www.epa.gov/epahome/whereyoulive.htm#regiontext

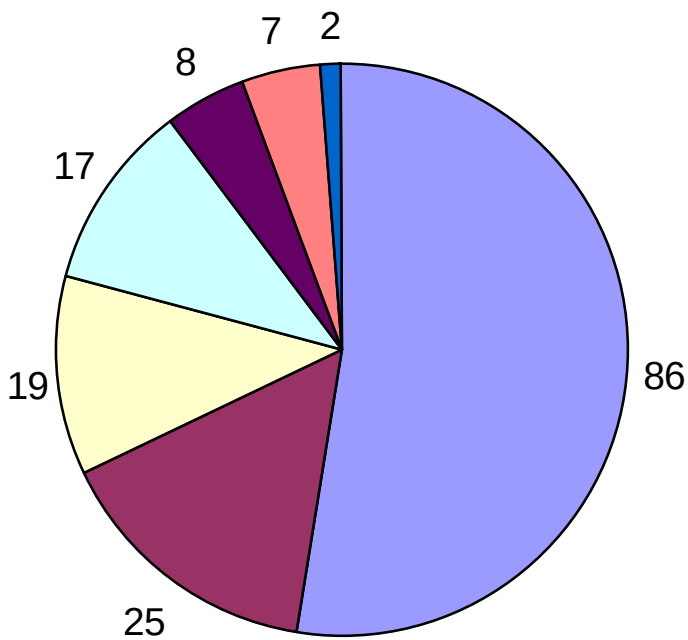
Involvement Timeline



On and Off Site Activity



Nature of Involvement



- Sampling and analysis (86)
- Ecological assessment (25)
- Outreach (19)
- Remediation technology (17)
- Environmental modeling (8)
- Other involvement (7)
- Epidemiological study (2)

Total number of sites= 95

Sampling and Analysis

	# of sites	# of samples (approx)
Soil samples	67	1990
Groundwater samples	8	1342
Surface water samples	23	387
Sediment samples	40	1577
Air samples	1	8
Other	17	1020
Total		6324

86 sites

Ecological Assessment

Species studied	Samples	PI
Aquatic and terrestrial	multiple samples	Donnelly
Bacteria, ribbed mussel, eels	200	Ford
bacterial community	NA*	Maier
Bacteria--specifically, methanotrophs	NA*	Scow
Benthic Invertebrates	200	Giesy
Chrysemys picta, Elliptio complanata	400	Callard, I
Coho Salmon	200	Donnelly
Cotton mice	20	Donnelly
Fish	5	Conklin
Killfish - *Fundulus heteroclitus*	200	Callard, G
Killfish - *Fundulus heteroclitus*	160	Di Giulio
Killfish - *Fundulus heteroclitus*	500	Hahn
Microbial communities in soil	NA*	Lindner
Plants & microorganisms	100	Conklin
Prothonotary warbler	230	Hooper
Racoon	130	Hooper
Rodents	30	Donnelly
Rodents & Birds	1400+	Hooper

25 sites

*NA=not available

Epidemiology Study

# of people in the sample	Adverse effect(s) studied	Project Investigator
450	hormonal, reproductive	Gold
3000	cancer, reproductive effects	Ozonoff

Remediation Technology

Technology applied on a pilot scale	9
Arnold (4) Kukor (1) Lindner (1) Hooper (1) Maier (2)	
Technology applied on site	11
Arnold (4) Donnelly (2) Lindner (1) Hooper (1) Maier (3)	

12 sites

Environmental Modeling

Type of model	Name	Developed/Modified	Project Investigator
Hyporheic zone modeling	OTIS	Modified	Conklin
Exposure to Dieldrin	None	Developed	Hooper
Groundwater	Modflow, MTC3D	Modified	Renshaw
Groundwater	BME	Developed	Christakos
Soil to wildlife bioaccumulation models	*NA	Developed	Hooper (2)
Sediment	*NA	No response	Hunt
Photo-Chemical Model	*NA	Developed	Arnold

*NA=Not Available

8 sites

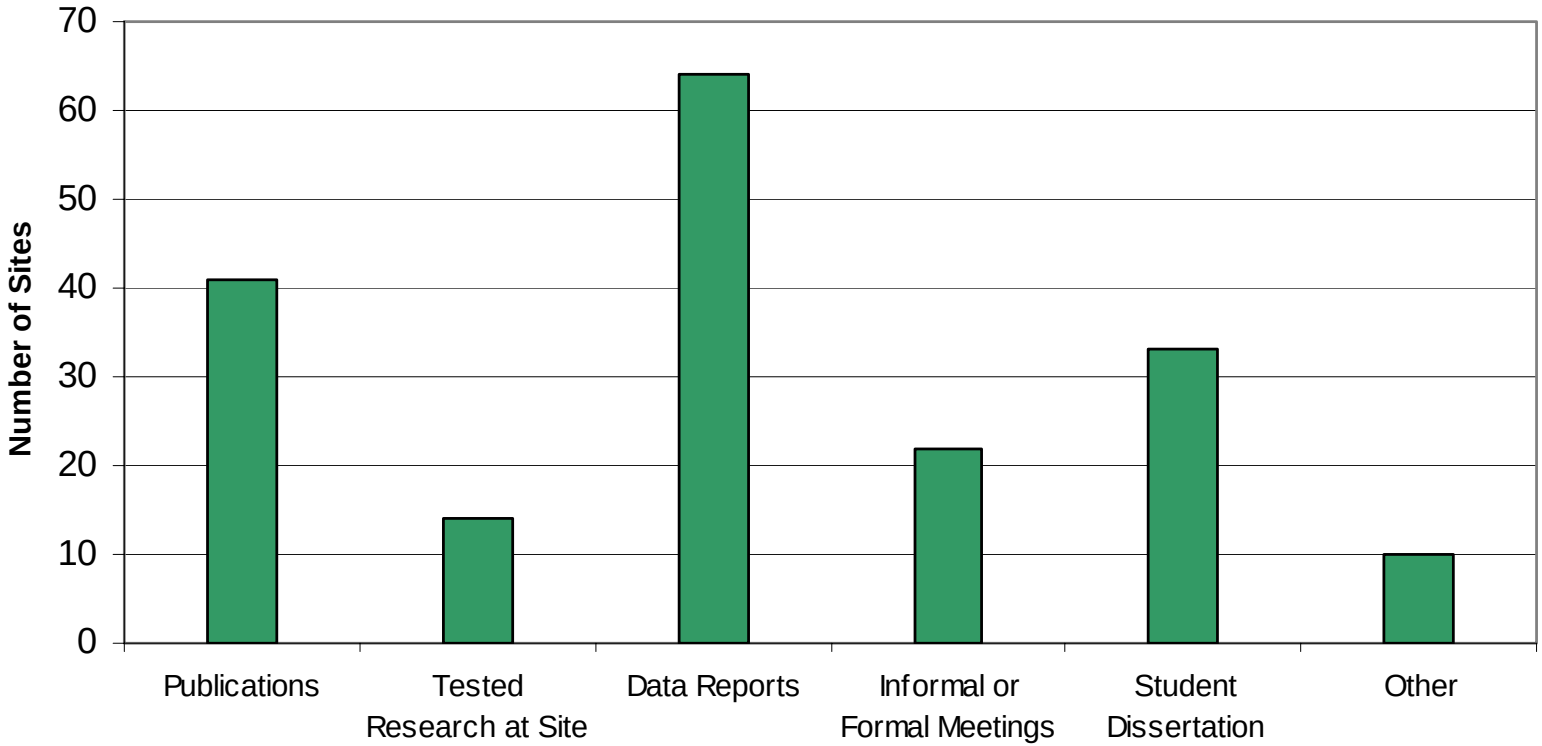
Outreach

Form of your support to the community	
Chemical fact sheets	2
Review of documents	5
Participation in public meetings	12
Other	10

Arnold	Donnelly
Bastin	Ford
Bopp	Kukor
Callard, I	Maier
Chang	Ozonoff
Christakos	Serrell
Di Giulio	Hooper

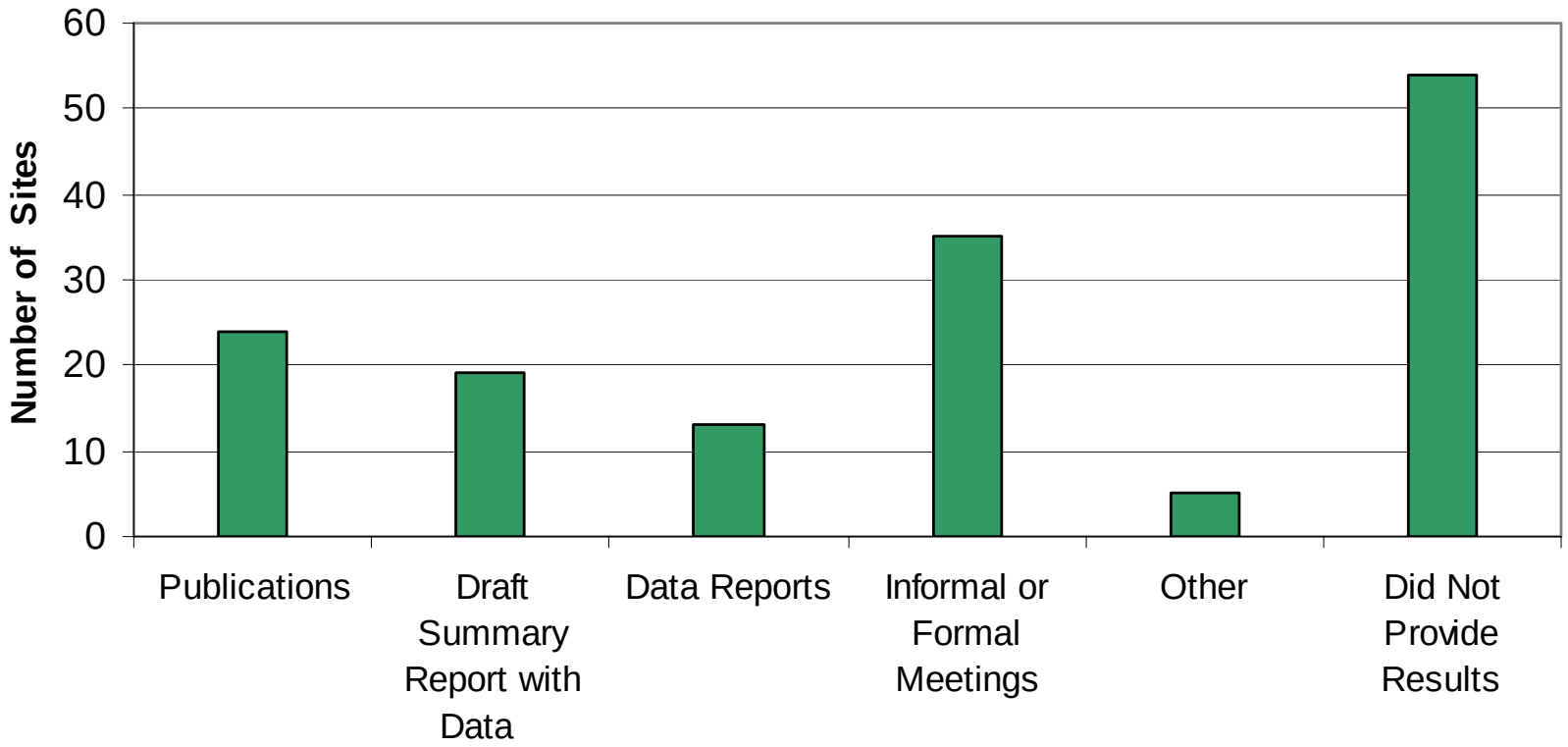
19 sites

Products of Efforts



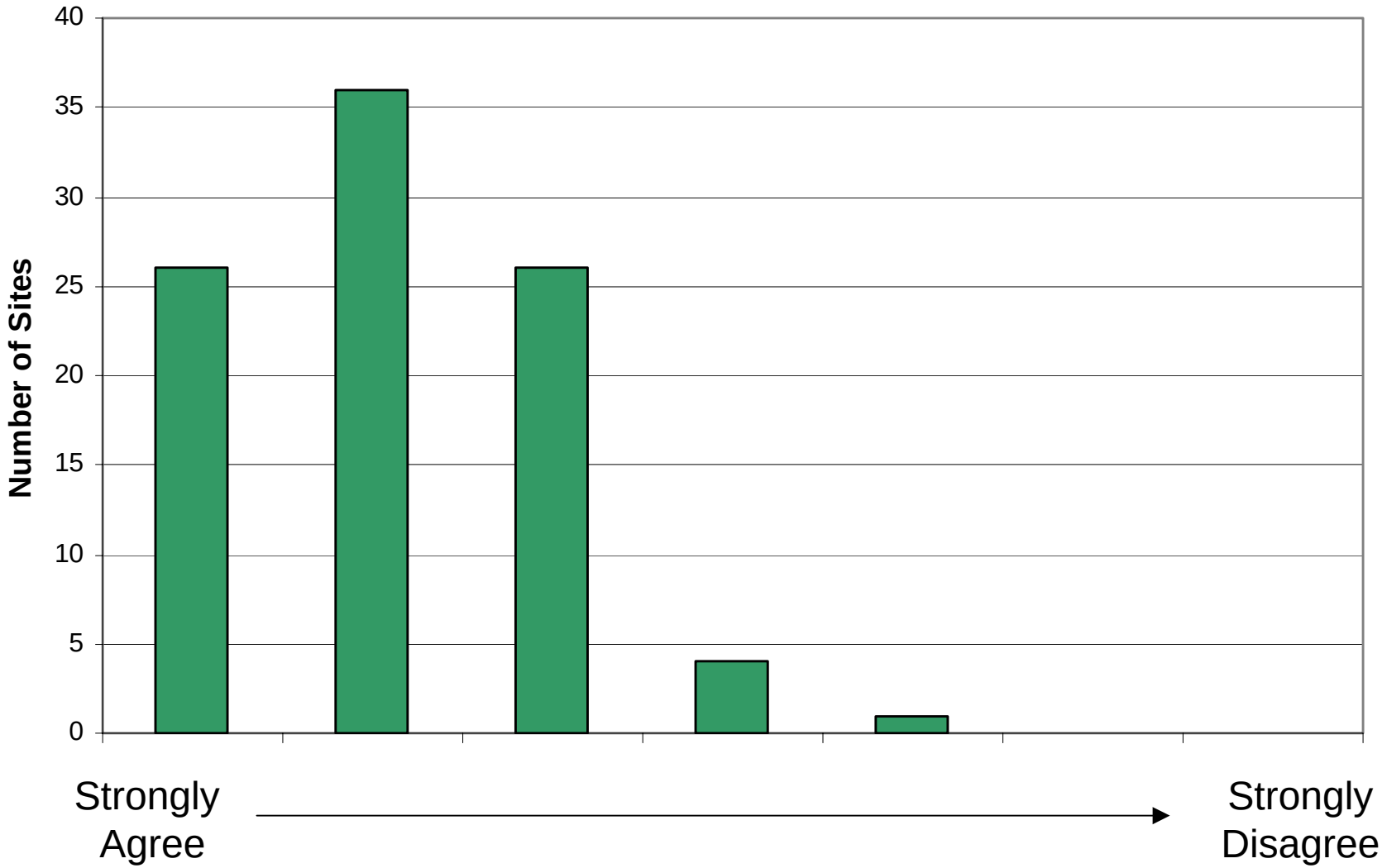
Number of sites= 103

Form of Results Given to Contact



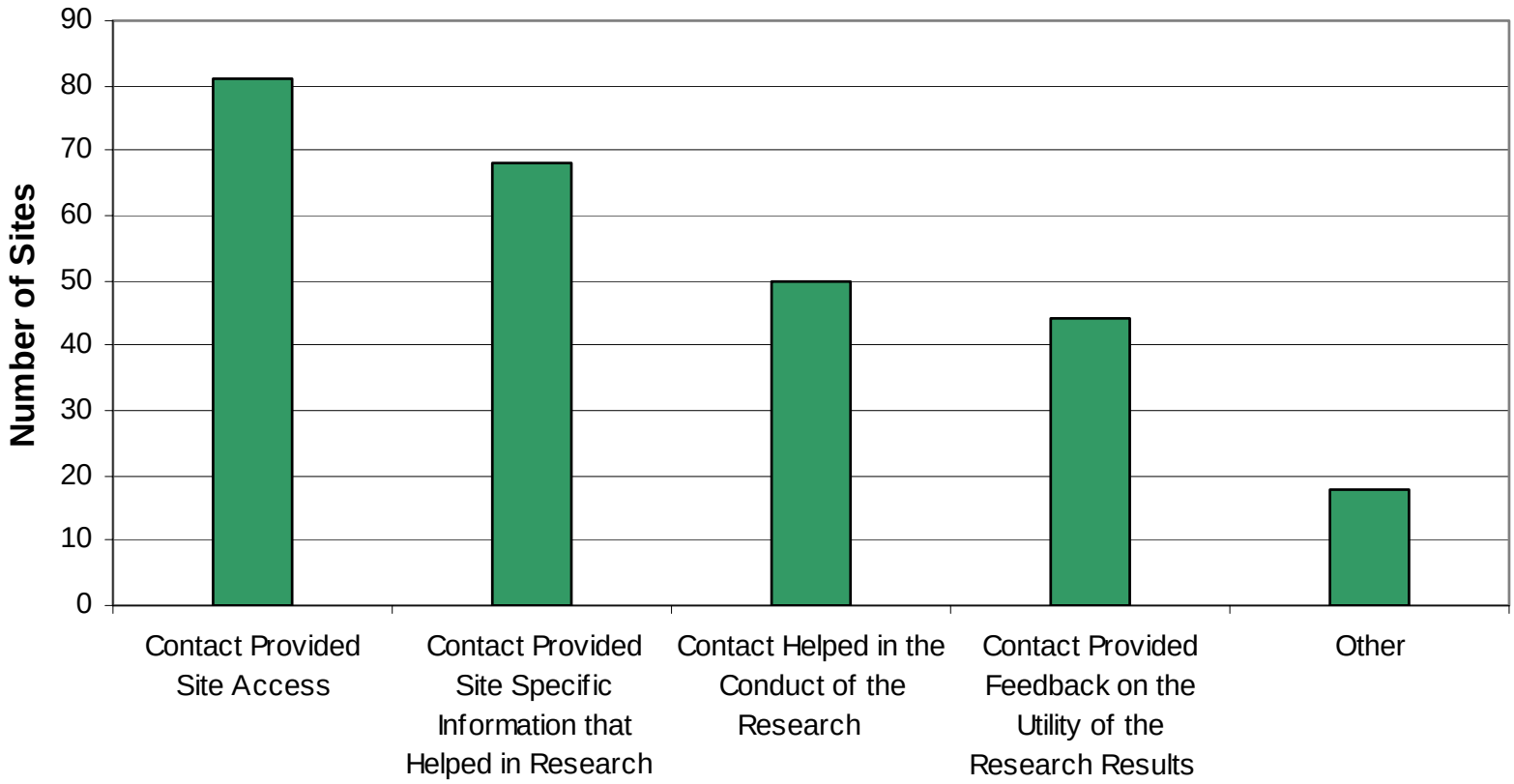
Number of sites= 95

Q: Overall, I believe that my work with the contact at the site was useful to *me and my* project.



Number of sites= 91

Q: How was the work with the contact useful to you?



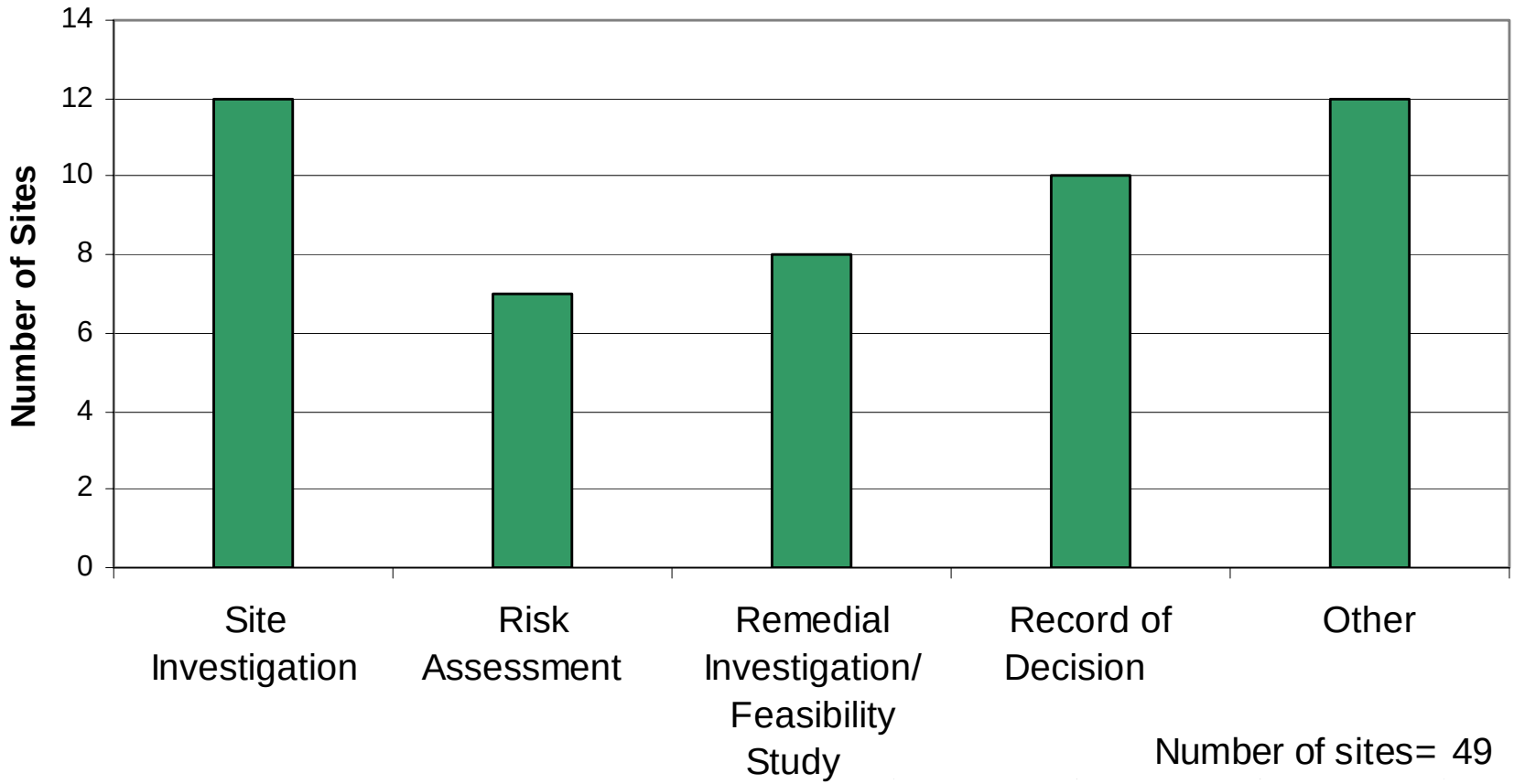
Number of sites= 100

Example comments:

Q: Overall, I believe my **outreach** support played a role in decisions or actions, or improving community understanding at the site.

- "Provided an alternative to mass media accounts of the issue." (Serrell)
- "Helped the community feel like they were doing something for themselves." (Bastin)

Use of research by the contact

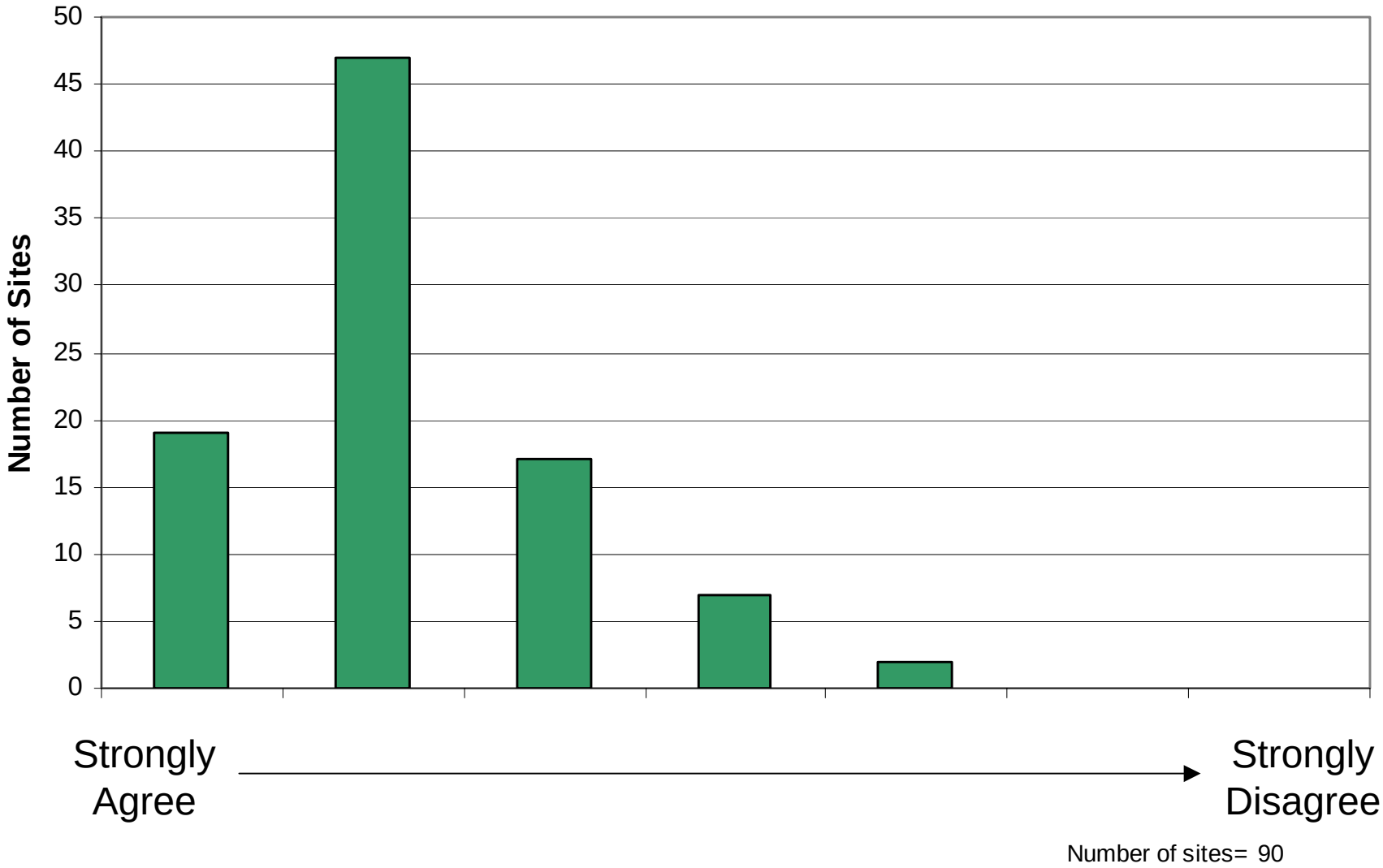


Example comments:

How my research helped inform or educate EPA, contractors, and/or the local community.

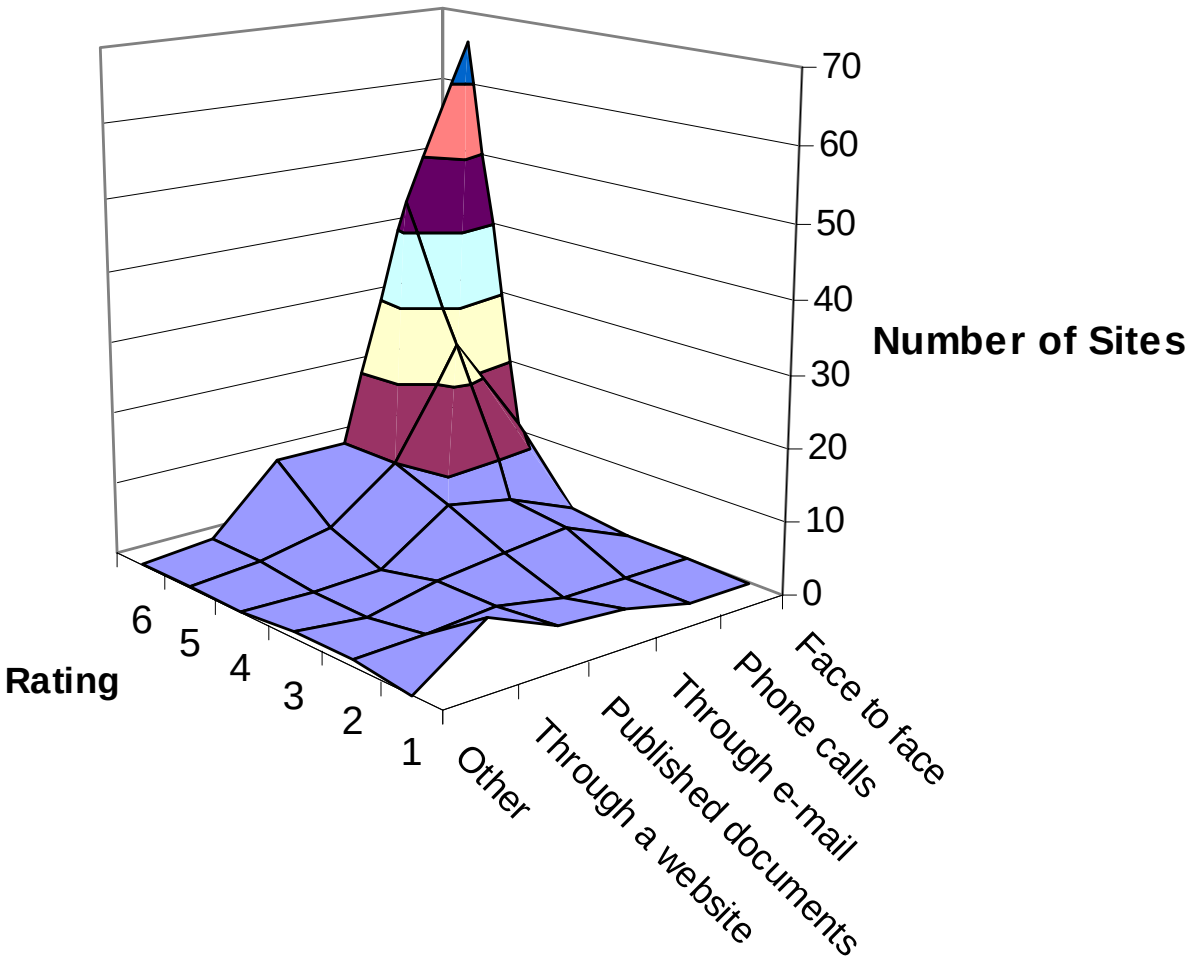
- "This research will help in determining how to bring this site to closure." (Maier)
- "Identified toxic areas to be remediated." (Giesy)
- "…gave them confidence in their approach." (Hunt)
- "Bioremediation is now in the ROD, and the community seems to be accepting of the remediation approach." (Kukor)
- "Texas A&M research results were incorporated into the training materials used in Illinois." (Donnelly)

Q: Overall, my communication with the contact was effective.



Number of sites= 90

Q. Please rate the method of communication that you feel contributed the most to the use of your research by the contact. (6 most effective 1 being the least)



Number of sites= 86

Obstacles include:

- “State didn’t want to know about any problems.” (Donnelly)
- “EPA staff were loaded down with other activities.” (Hunt)
- “…several personnel changes at the state.” (Conklin)
- “Contractor had unrealistic expectation of the performance of a research laboratory.” (Kukor)
- “The contact did not like our findings and interpretations and became uncommunicative.” (Callard, I)

What SBRP researchers could do:

- “Persistence and face to face contact are very important.” (Conklin)
- “We should have requested an interview with our contact's boss for a formal presentation of the results.” (Conklin)
- “Meeting with regional agency personnel and RPM helped understand and interpret the findings of the study.” (Hooper)
- “…a key to our …activities at the site is our agreement with the owner to keep the site name and location confidential.” (Donnelly)

To support research translation, the SBRP could:

- Continue funding remedial investigations
- Continue training support for students “who can provide the link to university activities”
- “Say that it is important”
- SBRP could provide guidance/support on:
  - securing access to hazardous waste sites
  - persistence in trying to communicate with site managers

Summary

- SBRP is active at Hazardous waste sites
  - Activity was reported at 27 sites in 2004
- The majority of work being done at hazardous waste sites is sampling and analysis
- Outreach and application of remedial technologies were reported at several sites
- SBRP funded research was used by EPA and State agencies for site characterization, human health, ecological risk assessment and RODs

Conclusions

- Project Investigators in general report that their work with the contact at the site was useful to them (products included: publications,research tested on site and student dissertations)
- Project Investigators report that their communication with the contact was effective, leading to site access, site specific information, help with the conduct of the research and feedback on the utility of the research results
- Researchers may not know if or how their research is being used by the site contact. This is an area of potential improvement/follow-up research

"Persistence and face to face contact are very important." (Conklin)

Potential next steps

- Follow-up with PIs to gain additional information
- Follow-up with EPA and State contacts
- Work with research translation cores to enhance communication with EPA and state contacts
- Work with research translation cores to improve data reporting
- Feedback to SBRP programs and EPA
- Publication
- Periodic updates

MDB, Inc.

Thank you!

- Special thanks to all the Project Investigators who filled out and returned their questionnaires, especially those with multiple projects!
- Thanks to those who will be providing responses in the future!
- Very special thanks to KC Donnelly for his hours of work on this project!

Justin Crane jpcrane@gmail.com

MDB, Inc.