















LTER Cyberinfrastructure Assessment Survey - February 2007.

This survey was designed to assess the current state and cyberinfrastructure (CI) needs of the LTER Network. The survey is an update of the 2005 CI assessment survey. Components of the survey were developed by the LTER CI Team to cover specific topic areas and updated based on results of an information management workshop held at the 2006 LTER All Scientists meeting. The survey is designed to assess the LTER Network as a whole. Although individual site information is gathered, all results are pooled. Note that the term "Site" is often used loosely to refer to the LTER site program itself, or in other instances, depending on context, to the physical research site itself.





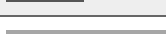

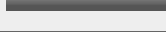

LTER Site Name and survey user

1. What LTER Site do you represent? Please select the LTER site acronym:

		Response Percent	Response Total
AND	<input type="checkbox"/>	3.8%	1
ARC	<input type="checkbox"/>	3.8%	1
BES	<input type="checkbox"/>	3.8%	1
BNZ	<input type="checkbox"/>	3.8%	1
CAP	<input type="checkbox"/>	3.8%	1
CCE	<input type="checkbox"/>	3.8%	1
CDR	<input type="checkbox"/>	3.8%	1
CWT	<input type="checkbox"/>	3.8%	1
FCE	<input type="checkbox"/>	3.8%	1
GCE	<input type="checkbox"/>	3.8%	1
HFR	<input type="checkbox"/>	3.8%	1
HBR	<input type="checkbox"/>	3.8%	1
JRN	<input type="checkbox"/>	3.8%	1
KBS	<input type="checkbox"/>	3.8%	1

KNZ		3.8%	1
LUQ		3.8%	1
MCM		3.8%	1
MCR		3.8%	1
NWT		3.8%	1
NTL		3.8%	1
PAL		3.8%	1
PIE		3.8%	1
SBC		3.8%	1
SEV		3.8%	1
SGS		3.8%	1
VCR		3.8%	1
Total Respondents			26
(skipped this question)			0

2. Please enter any of the LTER roles, duties, committee affiliations of the PRIMARY information management personnel at your site:

		Response Percent	Response Total
LTER Site Principal Investigator (i.e. is a signatory PI on LTER grant)		15.4%	4
LTER Research Scientist		30.8%	8
LTER Site Manager		19.2%	5
LTER Site Administrator		11.5%	3
LTER Climate Committee		23.1%	6
LTER Technology Committee Representative		26.9%	7
LTER Network Information System Advisory Committee		23.1%	6
LTER Education Committee Representative		0%	0
Other (please specify)		46.2%	12
Total Respondents			26
(skipped this question)			0










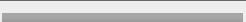




OTHER:

Please enter any of the LTER roles, duties, committee affiliations of the PRIMARY information management personnel at your site:

1.	IMExec
2.	LTER IM Executive Committee
3.	none

<u>4.</u>	none of these
<u>5.</u>	IM exec
<u>6.</u>	Other Professional
<u>7.</u>	Science Council, Executive Board
<u>8.</u>	Dedicated information manager
<u>9.</u>	none of the above
<u>10.</u>	social science representative
<u>11.</u>	Information Management
<u>12.</u>	social science rep

3. What position(s) most closely matches the general job functions of the PRIMARY information management personnel at your site? (select any/all that apply)

		Response Percent	Response Total
Student		3.8%	1
Technician		19.2%	5
System Administrator		50%	13
Network Administrator		30.8%	8
Software Developer		57.7%	15
Webmaster		88.5%	23
Spatial Data Manager/Analyst		53.8%	14
Database Administrator		76.9%	20
Research Assistant		19.2%	5
IT Professional		34.6%	9
Researcher		38.5%	10
Scientist		34.6%	9
University instructor/lecturer		0%	0
University Professor (any level)		15.4%	4
Other (please specify)		11.5%	3
		Total Respondents	26
		(skipped this question)	0

OTHER:

Please enter any of the LTER roles, duties, committee affiliations of the PRIMARY information management personnel at your site:

<u>1.</u>	IMExec
<u>2.</u>	LTER IM Executive Committee
<u>3.</u>	none
<u>4.</u>	none of these

<u>5.</u>	IM exec
<u>6.</u>	Other Professional
<u>7.</u>	Science Council, Executive Board
<u>8.</u>	Dedicated information manager
<u>9.</u>	none of the above
<u>10.</u>	social science representative

3. General data/information management infrastructure

4. How many full time positions (FTE's) does your site CURRENTLY allocate for ALL information management (all types including data entry from technicians, data management specialists, web designers etc.) at your site? This will include all funding sources. LTER funding from NSF, supplements, other NSF grants, partnerships, cost share etc.

		Response Percent	Response Total
0.0		0%	0
0.25		0%	0
0.50		3.8%	1
0.75		0%	0
1.00		19.2%	5
1.25		7.7%	2
1.50		7.7%	2
1.75		3.8%	1
2.00		19.2%	5
2.25		0%	0
2.50		3.8%	1
2.75		3.8%	1
3.00		7.7%	2
3.25		0%	0
3.50		7.7%	2
3.75		3.8%	1
4.00		0%	0
4.25		0%	0
4.50		0%	0
4.75		0%	0
5.00		3.8%	1
5.25		0%	0
5.50		0%	0
5.75		0%	0

6.00		0%	0
6.25		0%	0
6.50		0%	0
6.75		0%	0
7.00		0%	0
7.25		0%	0
7.50		0%	0
7.75		0%	0
8.00		3.8%	1
8.25		0%	0
8.50		0%	0
8.75		0%	0
9.00		0%	0
9.25		0%	0
9.50		0%	0
9.75		0%	0
10.0		3.8%	1
>10.0		0%	0
Total Respondents			26
(skipped this question)			0

5. How many full time positions (FTE's) does your site allocate for information management from the LTER funding from NSF, including supplements? The amount here, when subtracted from the total in the previous question should equal the number of FTE's who are funded from OTHER sources (other grants, cost-share etc).

		Response Percent	Response Total
0.0		0%	0
0.25		3.8%	1
0.50		3.8%	1
0.75		0%	0
1.00		30.8%	8
1.25		11.5%	3
1.50		15.4%	4
1.75		7.7%	2
2.00		11.5%	3
2.25		3.8%	1

2.50	■	3.8%	1
2.75		0%	0
3.00	■	3.8%	1
3.25		0%	0
3.50		0%	0
3.75		0%	0
4.00		0%	0
4.25		0%	0
4.50		0%	0
4.75		0%	0
5.00		0%	0
5.25		0%	0
5.50	■	3.8%	1
5.75		0%	0
6.00		0%	0
6.25		0%	0
6.50		0%	0
6.75		0%	0
7.00		0%	0
7.25		0%	0
7.50		0%	0
7.75		0%	0
8.00		0%	0
8.25		0%	0
8.50		0%	0
8.75		0%	0
9.00		0%	0
9.25		0%	0
9.50		0%	0
9.75		0%	0
10.0		0%	0
>10.0		0%	0
Total Respondents			26
(skipped this question)			0

6. Please indicate the type of background and training of the PRIMARY site information management personnel. "Formal training" means coursework or certification.

	High	Medium	Low	Response Total
Formal training or education in computer science.	15% (4)	46% (12)	38% (10)	26
Acquired (on the job training) computer science training.	46% (12)	50% (13)	4% (1)	26
Formal training or education in data management/database software.	8% (2)	35% (9)	58% (15)	26
Acquired (on the job training) in data management/database software.	54% (14)	46% (12)	0% (0)	26
Formal Ecological/Biological Science training or education.	77% (20)	12% (3)	12% (3)	26
Acquired (on the job training) in Ecological/Biological Science.	50% (13)	42% (11)	8% (2)	26
Formal GIS/Remote Sensing training or education.	35% (9)	27% (7)	38% (10)	26
Acquired (on the job training) in GIS/Remote Sensing.	35% (9)	54% (14)	12% (3)	26
Social Science or education.	4% (1)	27% (7)	69% (18)	26
Acquired (on the job training) in Social Science or education.	15% (4)	19% (5)	65% (17)	26
Total Respondents				26
(skipped this question)				0

7. Please RANK the following information management task areas, in order of effort at your site. The ranking should start with #1 being where you spend the most effort to #10 being where you spend the least effort. NOTE: You do NOT have to select all items if they don't apply. NO TWO can have equal importance - you have to decide...

	1 (most effort)	2	3	4	5	6	7	8	9	10 (least effort)	Response Average
General site data management including database development, data entry, providing data, archive and backup.	62% (16)	19% (5)	15% (4)	0% (0)	4% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1.65
Web design, maintenance and update.	8% (2)	23% (6)	19% (5)	31% (8)	4% (1)	8% (2)	4% (1)	0% (0)	4% (1)	0% (0)	3.62
Software development (writing scripts and code).	17% (4)	13% (3)	26% (6)	13% (3)	4% (1)	4% (1)	9% (2)	4% (1)	0% (0)	9% (2)	4.04
Metadata generation - creation, update, registration, harvesting.	0% (0)	23% (6)	19% (5)	23% (6)	23% (6)	4% (1)	4% (1)	4% (1)	0% (0)	0% (0)	3.92
Information Management directly related to Network-level and cross-site research.	8% (2)	4% (1)	4% (1)	4% (1)	12% (3)	33% (8)	8% (2)	17% (4)	8% (2)	0% (0)	5.75
Site system administration - site-based hardware and network support.	0% (0)	4% (1)	8% (2)	21% (5)	0% (0)	8% (2)	25% (6)	8% (2)	17% (4)	8% (2)	6.42
User SYSTEM support - hardware help and support for site personnel.	0% (0)	4% (1)	0% (0)	0% (0)	22% (5)	0% (0)	22% (5)	22% (5)	22% (5)	9% (2)	7.26
General user support - non-hardware related help for site personnel such as answering software related questions, study design, statistics, modeling etc.	4% (1)	8% (2)	8% (2)	0% (0)	20% (5)	16% (4)	8% (2)	20% (5)	8% (2)	8% (2)	6.08

Site administration tasks (filling out paperwork, ordering supplies, doing hardware inventory etc).	0% (0)	0% (0)	0% (0)	0% (0)	17% (4)	4% (1)	8% (2)	17% (4)	29% (7)	25% (6)	8.13
Other tasks not included in the above.	0% (0)	6% (1)	0% (0)	12% (2)	0% (0)	19% (3)	19% (3)	0% (0)	12% (2)	31% (5)	7.31
Total Respondents											26
(skipped this question)											0

8. What type of training would be most useful at your site? Please rank the following in order of need or importance. Note: No two items can have the same rank, but DO NOT SELECT ITEMS THAT ARE UNIMPORTANT.

	1 Most important	2	3	4	5	6	7	8	9	10 - Least needed	Response Average
Database management systems.	24% (5)	29% (6)	14% (3)	10% (2)	10% (2)	0% (0)	10% (2)	0% (0)	0% (0)	5% (1)	3.24
Metadata, EML and EML implementation.	25% (5)	15% (3)	15% (3)	20% (4)	15% (3)	10% (2)	0% (0)	0% (0)	0% (0)	0% (0)	3.15
Spatial data/GIS.	5% (1)	5% (1)	21% (4)	26% (5)	0% (0)	11% (2)	16% (3)	11% (2)	0% (0)	5% (1)	4.95
Use of advance technology including new sensors.	25% (5)	20% (4)	10% (2)	0% (0)	35% (7)	0% (0)	5% (1)	5% (1)	0% (0)	0% (0)	3.45
Wireless data transmission.	5% (1)	10% (2)	5% (1)	25% (5)	5% (1)	35% (7)	5% (1)	5% (1)	5% (1)	0% (0)	4.95
Programming and script writing.	10% (2)	24% (5)	10% (2)	10% (2)	19% (4)	5% (1)	10% (2)	5% (1)	10% (2)	0% (0)	4.38
Personnel management.	0% (0)	0% (0)	0% (0)	0% (0)	9% (1)	0% (0)	9% (1)	18% (2)	18% (2)	45% (5)	8.73
Proposal writing and preparation.	0% (0)	0% (0)	25% (3)	0% (0)	8% (1)	25% (3)	8% (1)	25% (3)	0% (0)	8% (1)	6.08
Scientific publication.	0% (0)	0% (0)	9% (1)	9% (1)	0% (0)	9% (1)	18% (2)	0% (0)	45% (5)	9% (1)	7.45
Web design, implementation.	11% (2)	11% (2)	21% (4)	16% (3)	5% (1)	5% (1)	16% (3)	11% (2)	0% (0)	5% (1)	4.63
Total Respondents											24
(skipped this question)											2

9. What major information management support, and level, is provided by the home/host institution(s) of your site rather than what your site provides for its own use? Select any that apply.

	Very Little	Some	Most	Response Average
Email (use the home institution's email system rather than one supported primarily by the site)	4% (1)	12% (3)	85% (22)	2.81
Database (use the institution's database system)	81% (21)	15% (4)	4% (1)	1.23
Web servers (use the institutions web servers)	81% (21)	12% (3)	8% (2)	1.27
Computational Infrastructure (use the institution's computational infrastructure for analysis, statistics, modeling, etc. rather than the site's own infrastructure)	62% (16)	35% (9)	4% (1)	1.42

Network infrastructure support is provided by the home institution.	8% (2)	19% (5)	73% (19)	2.65
System administration is provided by the home institution	38% (10)	62% (16)	0% (0)	1.62
Technical support is provided by the institution	23% (6)	73% (19)	4% (1)	1.81
Institutional (site) software licensing or educational discount	12% (3)	35% (9)	54% (14)	2.42
Total Respondents				26
(skipped this question)				0

10. What type of collaboration tools are used at your site (select all that apply, and enter any other not listed here)?

		Response Percent	Response Total
Regularly scheduled meetings.		80.8%	21
Common filesharing is used (such as a shared file system for users at the site).		80.8%	21
Email list servers.		69.2%	18
Telephone conferencing		61.5%	16
Video conferencing.		34.6%	9
Web tools for scheduling equipment, meeting rooms etc.		38.5%	10
Web Calendars.		46.2%	12
IM Chat (please include what type in "other" below).		23.1%	6
Collaborative web tools such as Wiki.		26.9%	7
Other (please describe)		19.2%	5
Total Respondents			26
(skipped this question)			0

OTHER:

What type of collaboration tools are used at your site (select all that apply, and enter any other not listed here)?

1. aol and yahoo im
2. irc
3. Yahoo and skype
4. IM chat is used infrequently for eml_dev (EML development discussion)
5. Web based bulletin board software (Discus)

11. What type of collaborative cyberinfrastructure / information management partnerships (outside of LTER) is your site engaged in?

		Response Percent	Response Total

The site maintains an active collaboration with high performance computer centers (SDSC, NCSA, etc).		26.1%	6
Collaborations with the National Center for Ecological Analysis and Synthesis (NCEAS).		30.4%	7
Collaborations with Forest Service or USDA		34.8%	8
Collaborations with the National Atmospheric Deposition Program (NADP)		39.1%	9
The site maintains an active collaboration with NASA archive centers.		13%	3
Collaboration with NASA researchers and research centers.		17.4%	4
The site maintains an active collaboration with local or national USGS centers such as NBII.		43.5%	10
Collaborations with the Ameriflux or Fluxnet Network.		13%	3
<input type="button" value="View"/> Other (please describe)		43.5%	10
Total Respondents			23
(skipped this question)			3

OTHER:

What type of collaborative cyberinfrastructure / information management partnerships (outside of LTER) is your site engaged in?

1. Taiwan Ecological Research Network
2. Past partnerships with SDSC & NBII, but not at this time.
3. SCCOOS (Southern Cal Coastal Observing System) SPOT (Système Pour l'Observation de la Terre) PISCO (Partnership for Interdisciplinary studies in Coastal Oceans)
4. most local agencies, ADEQ, ADWR, etc.
5. The Evergreen State College, Databank Project
6. WiscView is part of America View Network
7. None
8. social science and domain communities
9. CREON <http://www.coralreefeon.org/>
10. social science, domain communities

4. Site metadata and EML implementation.

12. What percentage of all site data has corresponding structured METADATA OF ANY TYPE, including EML?

		Response Percent	Response Total
0		0%	0
10		0%	0




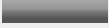

20		0%	0
30		0%	0
40		0%	0
50		3.8%	1
60		0%	0
70		0%	0
80		11.5%	3
90		23.1%	6
100		61.5%	16
Total Respondents			26
(skipped this question)			0

13. What percent of all site metadata has been converted to EML to at least the "identification" (base) level?











		Response Percent	Response Total
0		0%	0
10		0%	0
20		3.8%	1
30		0%	0
40		3.8%	1
50		3.8%	1
60		0%	0
70		3.8%	1
80		7.7%	2
90		19.2%	5
100		57.7%	15
Total Respondents			26
(skipped this question)			0

14. What percent of all site metadata has been converted to EML to the "discovery" level or beyond?






		Response Percent	Response Total
0		0%	0
10		0%	0
20		3.8%	1
30		0%	0

40		7.7%	2
50		0%	0
60		0%	0
70		11.5%	3
80		7.7%	2
90		15.4%	4
100		53.8%	14
Total Respondents			26
(skipped this question)			0

15. What percent of all site metadata has been converted to EML to the "integration" level or beyond?

		Response Percent	Response Total
0		7.7%	2
10		15.4%	4
20		3.8%	1
30		7.7%	2
40		3.8%	1
50		3.8%	1
60		0%	0
70		7.7%	2
80		15.4%	4
90		15.4%	4
100		19.2%	5
Total Respondents			26
(skipped this question)			0

16. Of the known site historical/legacy data - i.e. data the site might not consider part of its standard research data, what percentage has corresponding EML metadata (at any level)?

		Response Percent	Response Total
0		20%	5
10		12%	3
20		4%	1
30		8%	2
40		0%	0
50		12%	3

60		8%	2
70		4%	1
80		12%	3
90		4%	1
100		16%	4
Total Respondents			25
(skipped this question)			1

17. Of the known site GIS, including remote sensing data, what percentage of that total has corresponding EML metadata (at any level)?

		Response Percent	Response Total
0		40%	10
10		12%	3
20		4%	1
30		4%	1
40		0%	0
50		8%	2
60		0%	0
70		0%	0
80		4%	1
90		8%	2
100		20%	5
Total Respondents			25
(skipped this question)			1

18. Of the known site remote sensing data, what percentage of that total has corresponding EML metadata (at any level)?

		Response Percent	Response Total
0		56%	14
10		4%	1
20		8%	2
30		0%	0
40		0%	0
50		8%	2
60		0%	0
70		0%	0


80		4%	1
90		4%	1
100		16%	4
Total Respondents			25
(skipped this question)			1

19. About what percent of LTER site METAdata are registered/harvested in the LTER Metacat?

		Response Percent	Response Total
0		7.7%	2
10		0%	0
20		3.8%	1
30		0%	0
40		3.8%	1
50		0%	0
60		3.8%	1
70		15.4%	4
80		11.5%	3
90		11.5%	3
100		42.3%	11
Total Respondents			26
(skipped this question)			0




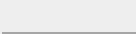


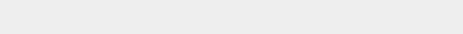
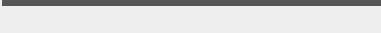
20. What percent of LTER site data have a direct link from the metadata, or the actual data are included in the metadata so that they can be directly accessed online?

		Response Percent	Response Total
0		15.4%	4
10		0%	0
20		0%	0
30		0%	0
40		0%	0
50		3.8%	1
60		3.8%	1
70		7.7%	2
80		3.8%	1
90		19.2%	5







100		46.2%	12
Total Respondents			26
(skipped this question)			0

5. Overview of site information management

21. What is the general way research data are managed at your site? Select all that apply.

		Response Percent	Response Total
The site information manager(s) manage most site data.		73.1%	19
The site information manager(s) enter most site data.		23.1%	6
Most site data is entered by site technicians.		69.2%	18
Researchers at the site enter most of their data into the site information management system.		19.2%	5
Student research data (i.e. thesis data) are generally included in the site information management system.		53.8%	14
Site legacy data (historical data existing before the site was established) are included as part of the standard site LTER data.		80.8%	21
Standard procedures or training exists for use by technicians and researchers to enter and manage their data.		65.4%	17
Standard procedures or training exists for use by technicians and researchers to enter and manage their METAdata.		53.8%	14
Total Respondents			26
(skipped this question)			0

22. What type of quality assurance and quality control (QA/QC) procedure does your site follow for site data? Select all that apply.

		Response Percent	Response Total
The site has documented specific QA/QC procedures of its own.		53.8%	14
The site follows specific QA/QC guidelines (e.g. EPA, USGS etc).		15.4%	4
Researchers are responsible for QA/QC of their own data.		80.8%	21
QA/QC guidelines are followed for MOST site data.		53.8%	14
QA/QC guidelines are not necessarily followed for all site data (such as student thesis data).		30.8%	8
Other (please describe)		15.4%	4

Total Respondents	26
(skipped this question)	0

OTHER:

What type of quality assurance and quality control (QA/QC) procedure does your site follow for site data? Select all that apply.


- 1.** Different types of data have different QC procedures.
- 2.** Site follows QA/QC guide for agencies such as EPA, NRCS, and NOAA, but this is limited to specific researchers that must follow those guidelines.
- 3.** data QAQC programs developed within the database
- 4.** QA/QC not well documented, but responsibility of the IM.

23. Please RANK in order from 1 to 10, the primary users of your data with #1 being the most frequent user of your site data. Note: No two items can have the same rank - you have to decide...

	1	2	3	4	5	6	7	8	9	10	Response Average
Site principal investigator(s)	58% (14)	17% (4)	12% (3)	4% (1)	8% (2)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	1.88
Site researchers (non-PI), technicians and staff.	13% (3)	52% (12)	13% (3)	17% (4)	4% (1)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	2.48
Site students	21% (5)	21% (5)	58% (14)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	2.38
Outside (non-site) researchers and students	14% (3)	14% (3)	9% (2)	41% (9)	23% (5)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	3.45
Outside or collaborating student researchers	0% (0)	0% (0)	9% (2)	32% (7)	55% (12)	0% (0)	0% (0)	5% (1)	0% (0)	0% (0)	4.64
Government agencies, NSF, NASA etc.	0% (0)	0% (0)	0% (0)	6% (1)	6% (1)	44% (8)	33% (6)	6% (1)	0% (0)	6% (1)	6.50
Policy makers, congress, government	0% (0)	0% (0)	0% (0)	0% (0)	6% (1)	12% (2)	24% (4)	29% (5)	18% (3)	12% (2)	7.76
Litigators, lawyers etc.	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	8% (1)	0% (0)	8% (1)	46% (6)	38% (5)	9.08
General public	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	35% (7)	30% (6)	30% (6)	5% (1)	0% (0)	7.05
Others not listed here	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	17% (2)	8% (1)	8% (1)	25% (3)	42% (5)	8.67
Total Respondents											25
(skipped this question)											1

24. How does your site track users of data? Select any that apply.

	Response Percent	Response Total
Users are tracked from information collected through data use policy forms.	61.5%	16
Users are logged by ftp or other internet tracking tools.	42.3%	11
Users are known since they must contact information managers for access to data.	11.5%	3
Users are known who must contact researchers for access to data.	15.4%	4







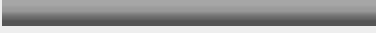

Other (please specify)		23.1%	6
Total Respondents			26
(skipped this question)			0

OTHER:

How does your site track users of data? Select any that apply.

<u>1.</u>	we have no way to determine who is downloading data
<u>2.</u>	Our site uses an honor system requesting data users contact the site IM or responsible investigators. For restricted access data, users are required to contact the resp. investigator to gain access.
<u>3.</u>	Voluntary notification of PI or information manager
<u>4.</u>	we collect ip addresses but nothing else
<u>5.</u>	no tracking except in response to data policy request
<u>6.</u>	no tracking except with responses to data policy requests

25. How are data generally distributed at your site? Select ALL that apply.

		Response Percent	Response Total
MOST site data are online and freely available and most data access does not require help from the site information manager(s).		76.9%	20
MOST site data are online and freely available but most requests still come to the information manager for what is available and how to access it.		26.9%	7
SOME site data are online although most data requests are filled by an information manager.		11.5%	3
Online data are limited and almost all site data are provided to requesters by an information manager.		0%	0
A "data license" or data use agreement is required for data use.		34.6%	9
A "data license" or data use agreement exists, but is voluntary.		42.3%	11
Response to data access are tracked or recorded.		50%	13
A procedure exists for access to sensitive or proprietary data - i.e. sensitive data is cataloged and a method to access the data exists.		53.8%	14
Other (please specify)		3.8%	1
Total Respondents			26
(skipped this question)			0

OTHER:

How are data generally distributed at your site? Select ALL that apply.

<u>1.</u>	Most people contact the IM for GIS data
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26. On-line site data are provided through the following mechanisms: Select all that apply.

		Response Percent	Response Total
The site website provides direct access to data.		96.2%	25
Site data are available though an "ftp" mechanism.		15.4%	4
Site data are generally managed as "flat files" in an organized file system, not in a database.		57.7%	15
Site data are generally managed as "html/xml files" in an organized file system, not in a database.		11.5%	3
Site data, stored as flat files or html/xml code are managed through a database system such as MySQL or Oracle.		11.5%	3
Site data are managed through a database system such as MySQL or Oracle.		61.5%	16
Site data are managed through a specialized system, software or scripts developed at the site.		38.5%	10
Other (please specify)		7.7%	2
Total Respondents			26
(skipped this question)			0

OTHER:

On-line site data are provided through the following mechanisms: Select all that apply.

1. GIS data are available through shared data drives.
2. site data are managed in a database, but downloadable as flat ASCII files

27. In addition to off the shelf tools for information management, briefly describe what tools, if any your site has developed.

		Response Percent	Response Total
Our site relies primarily on existing/off the shelf tools for information management.		61.5%	16
Other (please describe)		73.1%	19
Total Respondents			26
(skipped this question)			0






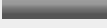
OTHER:

In addition to off the shelf tools for information management, briefly describe what tools, if any your site has developed.

1. online web forms for metadata form processing software dynamic online maps
2. Scripts, xslt...
3. administrative databases and metadata driven application tools
4. For some data types (an increasing number) we incorporate EML creation as the final rprocessing step. The IM creates the scripts to do this.
5. website is custom programed for datamanagement tasks










<u>6.</u>	Site has developed (1)custom content management system for website content and appearance, (2) search interfaces to photos (aerial/non-aerial), GIS (customized ArcIMS), and website and (3) to generate and manage site metadata including EML.
<u>7.</u>	perl scripts, vb programs
<u>8.</u>	resource/equipment management tools, qaqc tools
<u>9.</u>	Chemlab - lab management and data entry system Log2DB - remote sensor data middleware FishSamp - fish data collection software Zoopomatic - Computer assisted zooplankton counting and measuring Modis data processing applications EML generation applications Sensor network cyber dashboard Dynamic database query system dbBadger - data aggregation and analysis tool
<u>10.</u>	Many scripts to parse, QA/QC, and enter data into the MySQL database have been written. Some custom data entry programs have been written.
<u>11.</u>	perl scripts VBA scripts (macros)
<u>12.</u>	Use ARC, Jim Laundre Excel tool for EML generation
<u>13.</u>	applications to handle collections, ie bibliography, media gallery
<u>14.</u>	The FCE Excel2EML Perl converter program and Excel metadata spreadsheet are used to convert our metadata to EML. This program was developed at our site.
<u>15.</u>	relational database with client / server scripts accessing the database
<u>16.</u>	applications for local collections such as bibliography or media
<u>17.</u>	Tons of Perl Scripts
<u>18.</u>	GCE Data Toolbox - MATLAB-based software for metadata-based data processing, Q/C and analysis
<u>19.</u>	in-house development on php/mysql.

28. For GIS data maintained at the site (select all that apply):







		Response Percent	Response Total
Most site GIS/spatial data are provided online.		57.9%	11
Most site GIS/spatial data have corresponding EML metadata.		36.8%	7
Most original (raw) remote sensing data are included in the site spatial data holding.		52.6%	10
Most original remote sensing data are available online.		26.3%	5
Internet map services are used at the site for DISPLAY and SEARCH of GIS data.		68.4%	13
Internet map services are used at the site for ACCESS to GIS data.		15.8%	3
Total Respondents			19
(skipped this question)			7







6. LTER site instrumentation infrastructure

29. How are standard/routine meteorological data (data from more or less standard meteorological stations) collected/managed at the site ? For shipboard systems or buoys, use the closest method listed (select all that apply).

		Response Percent	Response Total
Meteorological data are manually collected by observing static instrument readings.		23.1%	6
Meteorological data are manually entered from the nearest NOAA, state climatologist or National Climate data center sources.		7.7%	2
Meteorological data are downloaded from the nearest NOAA or National Climate data center.		46.2%	12
Meteorological data are collected by interpreting paper, strip-chart or other information.		19.2%	5
Meteorological data are automatically collected by a digital hard-wired system.		38.5%	10
Meteorological data are collected by automated data logger systems, and later downloaded.		65.4%	17
Meteorological data are collected by hardwired phone/modem system.		15.4%	4
Meteorological data are collected by automated wireless phone (i.e. cell phone) system.		7.7%	2
Meteorological data are collected by automated radio or wireless transmission and collected automatically.		50%	13
Other (please specify)		0%	0
Total Respondents			26
(skipped this question)			0

30. What type of GPS location information is maintained for the LTER site? Please select all that apply, and add any information not listed here.

		Response Percent	Response Total
The site "boundary" is defined in spatial coordinates, for instance, a "shapefile" exists describing the site location.		76.9%	20
The primary research site locations are maintained in a file or database.		96.2%	25
The primary research site locations are publicly available on the site webpage.		65.4%	17
The primary research site locations are available on the NETWORK (i.e. sitedb) webpage.		26.9%	7
High precision control points or benchmarks are established for reference at the LTER site.		34.6%	9
The LTER site is mapped with a consistent grid of GPS locations.		19.2%	5







Most research data are not generally stored with GPS location information.		19.2%	5
Most research data are collected with GPS location information.		65.4%	17
Research data are generally collected with GPS location information accurate to 15m.		42.3%	11
Research data are generally collected with GPS location information with sub-meter accuracy.		34.6%	9
GPS location information is required for all research data.		19.2%	5
Other (please describe)		11.5%	3
Total Respondents			26
(skipped this question)			0

OTHER:

What type of GPS location information is maintained for the LTER site? Please select all that apply, and add any information not listed here.

1. For new studies would like GPS data, sometimes we can't get accurate locations because of canopy cover and steep slopes.
2. Accuracy of GPS is based on nearness of land-based stations. For data collected offshore, accuracy for gps coordinates is approximately 3m.
3. GPS location information is strongly recommended for all research data.

31. What type of GPS equipment is available for use at the site (select all that apply).

		Response Percent	Response Total
High precision DGPS equipment (better than 3m accuracy) is available for use at the site (using regional base station or other methods of correction).		46.2%	12
High precision DGPS equipment (better than 3m accuracy) has been used at the site, but is not generally available for research use.		15.4%	4
Wide Area Augmentation System (WAAS) enabled (better than 5m accuracy) GPS receivers are available for use at the site.		19.2%	5
Conventional GPS receivers (15m or worse accuracy) are generally available for use at the site.		42.3%	11
The site does not maintain GPS receivers for research use.		7.7%	2
Other (please specify)		11.5%	3
Total Respondents			26
(skipped this question)			0

OTHER:

What type of GPS equipment is available for use at the site (select all that apply).

1. I can't answer this question

2.	High precision DGPS available at the field Station		
3.	High precision DGPS borrowed through UNAVCO/LTER agreement		
32. Besides conventional meteorological measurements, what type of sensor systems are routinely used for data collection at the site? This may vary for terrestrial and/or aquatic systems. In other words, does your site routinely collect specialized data in an AUTOMATED fashion? (Please specify or describe).			
		Response Percent	Response Total
	Streamflow gauges or automated weir measurements, automated current measurements	56.5%	13
	Hydrographic moorings	8.7%	2
	A vertical profile system (thermistor chain etc) on a tower or buoy collects data.	43.5%	10
	A sensor network exists to collect spatial data.	17.4%	4
	Eddy covariance	34.8%	8
	Bowen Ratio	13%	3
	Other (please specify)	43.5%	10
Total Respondents			23
(skipped this question)			3

OTHER:

Besides conventional meteorological measurements, what type of sensor systems are routinely used for data collection at the site? This may vary for terrestrial and/or aquatic systems. In other words, does your site routinely collect specialized data in an AUTOMATED fashion? (Please specify or describe).	
1.	tide
2.	I can't answer this question
3.	Lake levels, ablation, underwater light, and surface light for 3 perennially frozen lakes.
4.	radiometers, tdr probes
5.	Acoustic Doppler Current Profiler
6.	Sensors for soil moisture and temperature.
7.	Water quality sonde data Marsh groundwater level ADCP
8.	autonomous vehicles
9.	thermistors, conductivity sensors, pressure sensors, current meters
10.	autonomous vehicles

33. The site has installed a wireless network for automated data collection at the site (this would include radio data transmission that is eventually linked directly to the internet).			
		Response Percent	Response Total
	Yes	60%	15
	No	40%	10
	If present, please describe :	20%	5

Total Respondents	25
(skipped this question)	1

OTHER:

The site has installed a wireless network for automated data collection at the site (this would include radio data transmission that is eventually linked directly to the internet).

- 1.** Seabird CTD, logging data with LabView, and sent to a campus PC via 3g wireless. To linux server with samba. Data is currently logged as text.
- 2.** Wireless system in place to collect meteorology and hydrology data at hourly and daily automated data collection.
- 3.** wireless cloud exists over MacKenzie Flats, location of most research
- 4.** A wireless network is installed at the site that could be used for automated data collection. At present it is used mainly by researchers for accessing the internet.
- 5.** Data are being collected from remote two streams and three weather stations using radios with a repeater tower. The data are not yet available on-line but should be within several weeks.


7. LTER site computer infrastructure:

34. What PRIMARY Server architecture is used for SITE data management? (select all that apply)

		Response Percent	Response Total
Netware		3.8%	1
MS Windows-based systems		65.4%	17
Mac-based systems (OS X Tiger, etc)		11.5%	3
Linux-based systems		42.3%	11
Other Unix (SunOS etc) based systems		26.9%	7
Other (please describe)		0%	0
Total Respondents			26
(skipped this question)			0

35. What archive and backup procedures are used at your site? (select all that apply)

		Response Percent	Response Total
Active site data are maintained on fault-tolerant (i.e. RAID) systems.		69.2%	18
The site uses a documented archive and backup plan.		73.1%	19
Site data are archived using tape backup systems.		76.9%	20
Site data are archived using CD or DVD or similar backup systems.		30.8%	8
Site data are archived using mirrored disk systems.		30.8%	8
Site data are archived using remote data archive facilities.		15.4%	4
Data backup includes off-site/secure storage.		80.8%	21








Other (please describe 	7.7%	2
Total Respondents		26
(skipped this question)		0

OTHER:



What archive and backup procedures are used at your site? (select all that apply)







- 1. Data are backed up to network disk appliances located in a different building.
- 2. Redundant external hard drive copies

36. About what TOTAL data storage capacity does your site maintain for general LTER related data including backup capacity and other storage?






		Response Percent	Response Total
less than 1gb		0%	0
1gb		0%	0
5gb		7.7%	2
10gb		0%	0
50gb		3.8%	1
100gb		7.7%	2
500gb		15.4%	4
1tb		19.2%	5
2.5tb		23.1%	6
5tb		23.1%	6
10tb		0%	0
50tb		0%	0
100tb		0%	0
500tb		0%	0
1pb		0%	0
>1pb		0%	0
Total Respondents			26
(skipped this question)			0

37. About what ONLINE data storage capacity does your site maintain for general LTER data and data distribution?





		Response Percent	Response Total
less than 1gb		0%	0
1gb		0%	0
5gb		7.7%	2
10gb		7.7%	2


50gb		15.4%	4
100gb		23.1%	6
500gb		23.1%	6
1tb		15.4%	4
2.5tb		3.8%	1
5tb		3.8%	1
10tb		0%	0
50tb		0%	0
100tb		0%	0
500tb		0%	0
1pb		0%	0
>1pb		0%	0
Total Respondents			26
(skipped this question)			0

38. What is the primary link speed from the Home Institution(s) to the Internet? In other words, what kind of Internet connection does your primary site institution, university etc. have? For multiple institution sites, select what most have, or what the primary site institution has.



		Response Percent	Response Total
Internet link is greater than 1 GB/s		34.6%	9
Internet link is 1Gb/s.		30.8%	8
Internet link is 100mb/s		23.1%	6
Internet link is 10mb/s		3.8%	1
Internet link is less than 10mb/s (i.e 1.54mb/s)		7.7%	2
There is no internet connection.		0%	0
Total Respondents			26
(skipped this question)			0

39. What type of internet capability is available for researchers at the Home Institution(s)? In other words, what is the general connection speed of your Local Area Network? Select the closest that applies.







		Response Percent	Response Total
Local Area Connection is greater than 1Gb/s.		15.4%	4
Local Area Connection is 1Gb/s.		26.9%	7
Local Area Connection is 100mb/s		42.3%	11
Local Area Connection is 10mb/s		11.5%	3

Local Area Connection is less than 10mb/s		3.8%	1
There is no internet connection.		0%	0
Total Respondents			26
(skipped this question)			0







40. Wireless internet is available for researchers at the home institution.

		Response Percent	Response Total
Yes		84.6%	22
No		15.4%	4
Total Respondents			26
(skipped this question)			0


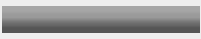
41. What is the speed of the primary link to the Internet at the Research SITE ?

		Response Percent	Response Total
Internet link is greater than 1 GB/s.		12%	3
Internet link is 1Gb/s.		4%	1
Internet link is 100mb/s		20%	5
Internet link is 10mb/s		4%	1
Internet link is less than 10mb/s		56%	14
There is no internet connection.		4%	1
Total Respondents			25
(skipped this question)			1




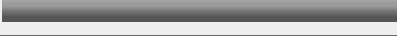





42. What type of internet bandwidth is available at the research SITE? In other words, what is the speed of the internal local area connection at the site? Select the closest that applies.

		Response Percent	Response Total
Local Area Connection is > 1Gb/s.		4%	1
Local Area Connection is 1Gb/s.		12%	3
Local Area Connection is 100mb/s.		32%	8
Local Area Connection is 10mb/s.		24%	6
Local Area Connection is less than 10mb/s. (i.e. 1.54mb/s)		24%	6
There is no internet connection.		4%	1
Total Respondents			25
(skipped this question)			1


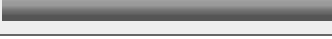

43. Wireless internet is available for researchers at the site.

		Response Percent	Response Total
Yes		72%	18
No		28%	7
Total Respondents			25
(skipped this question)			1

44. What type of conferencing capability is available at the site's home institution(s)? Select all that apply.

		Response Percent	Response Total
Local (on-site) phone conferencing is available.		92%	23
Shared phone conferencing capabilities are available at the institution.		72%	18
Local or shared ISDN video teleconferencing.		36%	9
Voice over Internet (such as Skype).		56%	14
Local internet video conferencing (such as Polycom video).		56%	14
Shared internet video conferencing (such as Polycom video) is available at the institution.		64%	16
Local satellite video conferencing.		4%	1
Shared satellite video conferencing is available at the institution.		4%	1
Local advanced video conferencing (such as ACCESS Grid) is available - the site has direct access or maintains an ACCESS Grid system.		0%	0
Shared advance video conferencing (such as ACCESS Grid) is available somewhere at the institution.		8%	2
Other (please describe)		0%	0
Total Respondents			25
(skipped this question)			1

45. What type of conferencing capability is available and used at the research SITE (select all that apply)?

		Response Percent	Response Total
Phone conferencing.		90.5%	19
Internet video conferencing.		47.6%	10
Satellite video conferencing.		4.8%	1
Advanced video conferencing (such as ACCESS Grid).		0%	0


Other (please specify)		14.3%	3
Total Respondents			21
(skipped this question)			5

46. What type of computational capabilities does your site provide to researchers for data analysis - modeling, statistical analysis and data synthesis? Select all that apply.

		Response Percent	Response Total
Investigators use their personal systems for analysis.		96.2%	25
The university/home institution provides most computational support for data analysis.		38.5%	10
A dedicated system is supported by the site for data analysis.		3.8%	1
A local computer cluster is available to researchers for data analysis.		30.8%	8
A remote computer cluster is available to researchers for data analysis.		3.8%	1
A direct link to high performance computer center is available to researchers for data analysis.		3.8%	1
Other (please describe)		0%	0
Total Respondents			26
(skipped this question)			0

47. If your site uses a database, what is/are the PRIMARY database system(s) used for METADATA? Here we are not considering the use of flat files or html by themselves as a database. Select any that apply but only include ones actually in use or currently being implemented.

		Response Percent	Response Total
SQL Server		20%	5
Oracle		8%	2
MySQL		20%	5
eXist		4%	1
MiniSQL		4%	1
Foxpro/Fox/Visual Foxpro		4%	1
Ingres		0%	0
Postgres		12%	3
Paradox		4%	1
Microsoft Access		16%	4
DB2		8%	2
Custom, site-designed database		0%	0
None, no database system is used for metadata		24%	6







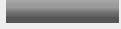




Other (please specify) 	4%	1
Total Respondents		25
(skipped this question)		1

OTHER:

If your site uses a database, what is/are the PRIMARY database system(s) used for METADATA? Here we are not considering the use of flat files or html by themselves as a database. Select any that apply but only include ones actually in use or currently being implemented.

1. Plan to use MySQL

48. If your site uses a database system for DATA, what is the PRIMARY database system(s) used ? Here we are not considering the use of flat files or html by themselves as a database. Select any that apply, but only include system actually in use or currently being implemented.


		Response Percent	Response Total
SQL Server		20.8%	5
Oracle		12.5%	3
MySQL		29.2%	7
eXist		0%	0
MiniSQL		0%	0
Foxpro/Visual Foxpro		4.2%	1
Ingres		0%	0
Postgres		8.3%	2
Paradox		4.2%	1
Microsoft Access		16.7%	4
DB2		8.3%	2
Custom, site-designed database		4.2%	1
None, no database system is used for site data		20.8%	5
Other (please describe)		4.2%	1
Total Respondents			24
(skipped this question)			2







OTHER:

If your site uses a database system for DATA, what is the PRIMARY database system(s) used ? Here we are not considering the use of flat files or html by themselves as a database. Select any that apply, but only include system actually in use or currently being implemented.

1. Plan to use MySQL

49. Does your site use any CASE tools (database design tools) for database management? Select any that apply.

		Response Percent	Response Total
None		45.8%	11













xCase		4.2%	1
DbDesigner		12.5%	3
MS SQLServer		16.7%	4
ERStudio		0%	0
MySQL PHP admin/MySQL Server		20.8%	5
Rational Rose		0%	0
Oracle Designer		0%	0
ERwin		0%	0
Microsoft Visio		12.5%	3
Other (please specify)		4.2%	1
Total Respondents			24
(skipped this question)			2

OTHER:

Does your site use any CASE tools (database design tools) for database management? Select any that apply.





















1. navicat

50. What basic analytic tools are used at your site (i.e. software)? Select any that apply, unless used rarely.

		Response Percent	Response Total
Microsoft Office Tools (Excel, etc.)		100%	26
Matlab		50%	13
Splus		26.9%	7
SAS		76.9%	20
SYSTAT		19.2%	5
SigmaStat		19.2%	5
SigmaPlot		61.5%	16
SPSS		19.2%	5
STATA		3.8%	1
Mathematica		11.5%	3
R		38.5%	10
Specialized/in-house (please describe)		0%	0
Other (please specify/describe)		3.8%	1
Total Respondents			26
(skipped this question)			0

OTHER:

What basic analytic tools are used at your site (i.e. software)? Select any that apply, unless used rarely.

1. JMP			
51. Please select or enter MAJOR Analytic MODELS or MODEL TOOLS in use at your site.			
		Response Percent	Response Total
BASIN		5%	1
CENTURY		25%	5
COVER		0%	0
GARP		0%	0
GEM		10%	2
TOPMODEL		15%	3
ECOTONE		10%	2
SOILWAT		5%	1
GEMRAMS		5%	1
GDAY		0%	0
DAYCENT		5%	1
STEPPE		5%	1
MM5		10%	2
UrbanSim		5%	1
ALFRESCO		5%	1
TEM		10%	2
STMTEM		0%	0
PALSELM		0%	0
NYMAN		0%	0
HYMAN		0%	0
PNET		10%	2
RAMS		10%	2
DYRESM		5%	1
MBL-MEL		10%	2
MBL-GEM		10%	2
REMM		0%	0
RIVMOD		5%	1
SAGE		0%	0
SAVANNA		0%	0
Other (please specify)		45%	9
Total Respondents			20
(skipped this question)			6

OTHER:

Please select or enter MAJOR Analytic MODELS or MODEL TOOLS in use at your site.

<u>1.</u>	Hydrodynamic models (e.g., Venice Lagoon Model)
<u>2.</u>	STELLA
<u>3.</u>	The climate models are called "topoclim". They are topographically driven.
<u>4.</u>	HECRAS (USGS model for rating curves)
<u>5.</u>	Since our researchers are spread across many different institutions, I don't know what models are being used.
<u>6.</u>	FVCOM, U. Mass. Dartmouth River-N, U. New Hampshire
<u>7.</u>	local population models; numerical models ROMS
<u>8.</u>	BROOK90, PnET-BGC
<u>9.</u>	SqueezeBox - estuarine transport model developed by site investigators

52. What type of data visualization software tools (separate from GIS and statistical tools) are used at your site? Select any that apply, unless used rarely

		Response Percent	Response Total
OpenDX		4.3%	1
VisDB		0%	0
XmdvTool		0%	0
Matlab		43.5%	10
Spotfire		0%	0
Visionary		0%	0
NONE are used (site uses statistical and GIS packages)		47.8%	11
Other (please specify)		21.7%	5
Total Respondents			23
(skipped this question)			3

OTHER:

What type of data visualization software tools (separate from GIS and statistical tools) are used at your site? Select any that apply, unless used rarely

<u>1.</u>	3D Nature Studio
<u>2.</u>	unknown
<u>3.</u>	Tecplot, Mathematica
<u>4.</u>	gmt, jpgraph, google maps
<u>5.</u>	gmt, jpgraph, google maps, idl

53. What type of GIS software tools are used at your site ? Select any that apply, unless used rarely.

		Response Percent	Response Total
ArcGIS, ArcView, ArcServer etc.		96.2%	25
Erdas Imagine		38.5%	10

IDRISI		11.5%	3
eCognition		7.7%	2
ENVI		11.5%	3
IDL		3.8%	1
GRASS		0%	0
ERMapper		0%	0
Custom designed (please describe)		7.7%	2
None		0%	0
Other (please specify or describe)		15.4%	4
Total Respondents			26
(skipped this question)			0

OTHER:

What type of GIS software tools are used at your site ? Select any that apply, unless used rarely.	
<u>1.</u>	MapInfo
<u>2.</u>	MODIS image software - custom-developed software for acquiring and preprocessing MODIS satellite imagery. OrthoMapper - digital photogrammetric system
<u>3.</u>	RiverGIS, U. New Hampshire
<u>4.</u>	commercial satellite packages

54. What type of PROJECT management tools are used at your site ?			
		Response Percent	Response Total
Microsoft Project		8.3%	2
Open Workbench		4.2%	1
MindManager		8.3%	2
dotProject		0%	0
None		83.3%	20
Other (please describe)		8.3%	2
Total Respondents			24
(skipped this question)			2

OTHER:

What type of PROJECT management tools are used at your site ?	
<u>1.</u>	central Desktop
<u>2.</u>	custom database, with input applications and display on web

8. General site cyberinfrastructure needs

55. If your site were to increase the volume of data or the number of datasets you are managing by a factor of 10, 100 or more, Please rank the needs, in order from 1 to 10, in order of importance (1 is most important) that your site would require. Note: You do not need to select all items. No Item can

have the same rank, you have to decide...

	1 -most important	2	3	4	5	6	7	8	9	10 -least important or relevant)	Response Average
Faster/better internet connection speed (wireless etc) in the field.	5% (1)	20% (4)	5% (1)	5% (1)	15% (3)	20% (4)	5% (1)	10% (2)	10% (2)	5% (1)	5.30
Faster/better internet connection speed at the field site.	12% (2)	6% (1)	6% (1)	18% (3)	18% (3)	6% (1)	12% (2)	6% (1)	18% (3)	0% (0)	5.24
Faster/better internet connection speed from the home institution to the internet.	0% (0)	0% (0)	13% (2)	0% (0)	7% (1)	0% (0)	7% (1)	0% (0)	13% (2)	60% (9)	8.40
Better, faster software for managing metadata.	0% (0)	17% (3)	17% (3)	22% (4)	0% (0)	11% (2)	11% (2)	17% (3)	0% (0)	6% (1)	5.06
Better, faster software for managing data.	11% (2)	11% (2)	32% (6)	11% (2)	5% (1)	5% (1)	11% (2)	5% (1)	11% (2)	0% (0)	4.37
Training for information management personnel.	14% (3)	29% (6)	0% (0)	5% (1)	5% (1)	19% (4)	10% (2)	10% (2)	5% (1)	5% (1)	4.62
A faster or more server(s).	5% (1)	5% (1)	16% (3)	26% (5)	21% (4)	0% (0)	5% (1)	5% (1)	5% (1)	11% (2)	5.05
More disk space for data storage at the home institution.	12% (2)	12% (2)	6% (1)	18% (3)	6% (1)	24% (4)	6% (1)	12% (2)	6% (1)	0% (0)	4.82
More disk space for data storage at the field site.	0% (0)	6% (1)	12% (2)	18% (3)	29% (5)	6% (1)	12% (2)	12% (2)	0% (0)	6% (1)	5.35
More information management personnel.	55% (12)	14% (3)	9% (2)	0% (0)	5% (1)	5% (1)	5% (1)	0% (0)	9% (2)	0% (0)	2.73
Total Respondents											25
(skipped this question)											1

56. What new cyberinfrastructure is your site planning to implement in the future? (If you have no specific plans, just list "nothing planned".

Total Respondents

25

(skipped this question)

1

OTHER:

What new cyberinfrastructure is your site planning to implement in the future? (If you have no specific plans, just list "nothing planned".

1. -- Providing Improved Geospatial Perspectives – We will be revamping how we deal with geospatial information. For research locations, the current approach using a location data table containing coordinates or bounding boxes for named locations is sound, but needs to be extended to support arbitrary polygons. We also need to enhance our system to better deal with geospatial data such as GIS coverages and model products, by increasing its compatibility with Ecological Metadata Language data structures. Currently FGDC metadata is included as text inside our metadata descriptions. However, a more structured approach will extend the utility of our metadata for data discovery. These improvements will also demand improved online tools for capturing geospatial information. We plan to expand our use of Mapserver and OpenGIS technologies to help meet that need. -- Streamlining Data Ingestion - During 2002-2003 we installed a wireless network that extends from our laboratory to Hog Island, 20 km off the coast of Virginia. Since then, we have used the network for harvesting tide and meteorological data and over 400,000 images from webcams that observe landscapes and species-specific research sites at hourly or higher frequencies. Currently the information systems and databases for processing these data sources are hand-coded. To streamline this process we will develop metadata-driven tools that automatically create programs for ingestion, QA/QC and processing of data streams once the basic metadata describing the data stream has been entered. We also will continue work on the development of more generic systems for entering field data collected by individual researchers, staff and students. -- Improving Data Storage to Aid Integration – Thus far, the majority of VCR/LTER datasets are stored in text files. Unlike many more complex forms of data which are subject to frequent revisions (e.g., Excel v1.0 vs Excel97 files), text files have excellent archival characteristics. Similarly, most researchers are familiar with the use of text files and can easily use them with analytical software. However, use of text

	files can also introduce challenges. For example, researchers often code missing values with a letter or word such as "NA" for Not Available. However, when imported for analysis some software (particularly databases) respond badly to finding non-numerical data in a numerical field and may fail. Similarly, for a few very large datasets (e.g., meteorological data), data users may not wish to have all stations and dates, but only a subset. For these reasons we plan to develop database structures that will allow our data to be accessible both as the existing ASCII text and directly from either a database, or a structured form that has existing tools associated with it (e.g., OpenDAP, NetCDF).
<u>2.</u>	Internet connection will be upgraded from T1 line to 100 mbps optical fiber in Sep 2007.
<u>3.</u>	More capacity, more remote sensing. Increased use of collaborative systems.
<u>4.</u>	Installing wireless network in watershed. May add power. May use RF harvested powered sensors.
<u>5.</u>	nothing planned
<u>6.</u>	Nothing planned
<u>7.</u>	Current plans call for more metadata into postgres and automated creation of EML documents and data tables, with data loaded into postgres as appropriate.
<u>8.</u>	nothing planned
<u>9.</u>	we are currently implementing direct links to data download in all EML files. GIS files will be accessible through ARCIMS soon. We are working with local agencies to bring their data into a data access portal 'Arizona Hydrologic Information System'.
<u>10.</u>	Site has plans to increase the wireless coverage for the research site area, deploy sensor networks (automated dust collector samplers and automated sensors for measuring water and sediment vertical redistribution), automate rain gauge network with wireless and dataloggers, increase storage capacity, deploy improved router and firewall at research site, and explore high speed (Gb)point-to-point wireless to increase bandwidth to field site. Funding mechanisms are being explored for most of the items above except the router/firewall which we have already funded.
<u>11.</u>	adding internet to remote field labs using Frequency Hopping High Throughput Ethernet Bridges (FreeWave HT Plus)
<u>12.</u>	new server at end of 2007
<u>13.</u>	Enhanced query interface to online data catalog. Online access to [some] remote sensing data sets. Method to use GPS to record most field sampling locations.
<u>14.</u>	Studies are being added that will employ new sensors for monitoring soil nutrients.
<u>15.</u>	nothing planned
<u>16.</u>	Development of data base structure. Query capability
<u>17.</u>	New main building at research site to extend wired and wireless network. Possible wireless access at various locations across research site.
<u>18.</u>	-migrate to open directory services -specializing servers for optimized, more robust services -developing & enacting local best practices and developing working standards
<u>19.</u>	Possibly hiring an additional information manager.
<u>20.</u>	generate EML from relational database
<u>21.</u>	-partnering locally to create critical mass for continued im environment -migrate to open directory services -specializing servers for optimized, more robust services -developing & enacting local best practices and developing working standards
<u>22.</u>	Expansion of the wireless sensor network
<u>23.</u>	nothing planned
<u>24.</u>	nothing planned
<u>25.</u>	bandwidth is strong, hardware is up-to-date.

57. What specific barriers exist to better data use or management at your site?

Total Respondents

24

(skipped this question)

2

OTHER:

What specific barriers exist to better data use or management at your site?	
1.	There is a constant competition between the need to develop new and better tools and the day-to-day operations of the existing system.
2.	Not enough FTEs.
3.	Proximity.
4.	Faster and efficient near-real time QA of streaming data. Metadata generation.
5.	Need to train IM and personnel in web programming and specific scripts language (like Perl, Java, etc.)
6.	Rainfall data is read manually from rainfall graphic
7.	There is not enough time to get all the code written.
8.	Since all our PIs are at different institutions, they all have their own procedures for managing their data. They sometimes prefer to have their primary datasets at their own institution where they have control over them, rather than using a primary remote server for the whole LTER. The system is quite decentralized, though I do receive all the data eventually after everything has been published.
9.	Limited resources (prioritized list): 1. Information management personnel 2. Limited wireless coverage at research site (LARGE area) 3. Storage capacity (need for storage capacity growth to support collection and analysis of imagery and sensor networks has resulted in approximately doubling storage capacity every 18 months for last 4-5 years) 4. Sensor network systems to minimize technician time collecting data manually (including automated QA/QC of streaming data and algorithms for monitoring and maintaining sensor networks) 5. Access to high speed (CPU, bus) servers at site including servers with fast, powerful graphics capabilities to support image analysis and mapping
10.	n/a
11.	lack of enough personnel
12.	Need better tools to manage high volume /high freq data. Tools for accessing data and linking data to models in near real time Limited personnel resources. Need more training of users. Need for better ways of integrating management of very different broad categories of data (e.g., traditional field/laboratory measurements versus continuous time-series data from automated sensors versus spatial data)
13.	With the exponentially increasing volume of data from our field sensors, having a programmer is essential. A few years ago it was possible to readily hire a skilled student programmer to help write programs to QA/QC data, write query pages for the web, and do other data massaging tasks. Now student programmers are almost impossible to find. We need custom software to graph and provide the sensor data online, and meeting these goals has been greatly delayed because we haven't been able to get programming help.
14.	Personnel for data synthesis leading to publications.
15.	Need more automated way of managing data
16.	Need to draft overarching data strategy and philosophy statement.
17.	-old practices and mindsets re information handling -lack of appropriate planning and organizational shifts to accommodate infrastructure needs
18.	A big barrier is the amount of time that the information manager and project manager has to spend doing system administration...it would be nice to have trained systems personnel to take care of the system.
19.	- people are distributed at different universities - MCR is a new site, hence IM means planning and implementing the IM system and collecting data and metadata at the same time. However, writing, testing and releasing stable products requires to stay focused and does not allow a lot of time for major network contributions, and sometimes even doesn't allow enough time to keep up with site activities.
20.	-lack of resources, appropriate planning, and long-term vision dialogue given ongoing practices and existing conceptual models -lack of supportive institutional organizational structures
21.	lack personnel

22.	Having PIs use the core data
23.	effort required to generate metadata
24.	limitations of software in internet mapping.
58. What new/additional sensor technology capabilities does your site require to improve your site or Network-level science?	
Total Respondents	
20	
(skipped this question)	
6	

OTHER:

What new/additional sensor technology capabilities does your site require to improve your site or Network-level science?	
1.	At the site level, we are working on developing flux towers and a tunable diode laser trace gas analyzer. We would like to install radio receivers to allow automated animal tracking. At the Network level, clear standards need to be adopted on what types of data are needed, prior to selection of specific technologies.
2.	Plans are under development for a sensor network to measure ecosystem water flux.
3.	Wireless sensor network improvements.
4.	Low powered (like RF harvest) sensors. Newer technologies for lab equipment.
5.	System to capture sounds from the forest is being attempted at the present...do not know the details about this
6.	We need a sensor to automatically record rainfall data.
7.	No new sensor technology is currently planned.
8.	I can't answer this for all our researchers, as I don't know enough about their science. Though being Antarctic site, automatic sensors present a problem due to the extreme cold of the winter.
9.	We are working on wireless download of our tower and weather station data. The sensors are in place but the wireless and data stream management need to be improved. One more tower will be installed soon.
10.	1. Automated dust collector samplers 2. Automated sensors for measuring water and sediment vertical redistribution 3. Automated meteorological sensors (precipitation, soil moisture (including sandy soils), flow sensors, and crest gauges)
11.	n/a
12.	unknown, maybe wireless in the field
13.	More sensor types - e.g., biological sensors. Tools for high volume / high freq data collection and processing. Autoconfiguration of sensors and programs. Better QA/QC tools.
14.	More wireless connectivity for sensors in the field. Sensors for trace gases, soil/water nutrients, and for biomass/primary production. Note: any new sensors personnel for maintaining the sensor and for data analysis/synthesis
15.	NOAA/NOC water level station Flux tower Water quality sondes with radio transmission
16.	-autonomous vehicles -site specific instrumentation w/new deployment arrangements (ie moorings) and high data rates
17.	Not sure
18.	1. underwater marine acoustic modems 2. Newly available automated nitrate sensors would be useful for quantifying nutrient fluxes. 3. Inexpensive current measuring technologies would enable widespread monitoring of flow conditions in lagoons at the site. 4. A communications network allowing remote downloading of data from underwater sensors would enable adaptive, real-time experiments to sample important transient phenomena. It would also reduce technician field time.
19.	developing site specific instrumentation using new IT capacities
20.	wireless access for mooring sensors, additional meteorological sensors with wireless access

59. What new or additional cyberinfrastructure/IT capacity does your site require to improve your site

or Network-level science?	
Total Respondents	22
(skipped this question)	4

OTHER:

What new or additional cyberinfrastructure/IT capacity does your site require to improve your site or Network-level science?

1.	Better tools for large-scale data integration are needed.
2.	Plans are under development for a field wireless network.
3.	More ability to roll out new systems in home and field sites.
4.	More remote power in the field, beyond a bank of solar powered batteries. LIDAR imagery for entire and surrounding site. The ability to QA high frequency streaming data quickly and efficiently. Some sort of lab information management system. A local, affordable, intranet for data transfer between lab instruments.
5.	Video Conferencing; capability to login onto servers remotely
6.	No planned
7.	Time to get the code written - either by the single dedicated info manager or through collaborations. This is basically the same list of items as in question 56, but scaled to specific, existing projects.
8.	faster connections at the home institution; Possibly an additional server for spatial data serving
9.	capable permanent staff, not students who have to be trained and never quite make it to the level of independent work that is needed.
10.	Limited resources (prioritized list): 1. Information management personnel 2. Wireless systems and associated components (antennas, towers, photovoltaic panels, batteries, radios, etc.) 3. Increased storage capacity (4-8TB) 4. New and faster servers (analytical processing, advanced graphics and mapping, replace older servers) 5. New desktops/laptops for new personnel and to replace older computers)
11.	Programmer.
12.	New server
13.	More personnel resources. Federated databases. Data integration tools. Collaboration tools.
14.	It would be helpful for all scientists at the site to have easy access to videoconferencing.
15.	Faster field network
16.	Database development with automated EML generation and query capability
17.	-insights on infrastructure and federation approaches and resources -network level collaborative forums on smaller working scales -development of technology champions with sociotechnical awareness and vision -understanding of how to collaborate on working standards
18.	Not sure
19.	local instance of the database at the field site
20.	-insight on federation and on processes for developing working standards -network level collab tools and phased in approach to projects -organizational placement of technical infrastructure with institution -dev of sociotechnical awareness and process building
21.	Field laptops and wireless abilities in the field
22.	field data storage and communications infrastructure improvements

End of LTER 2007 Cyberinfrastructure Survey

