

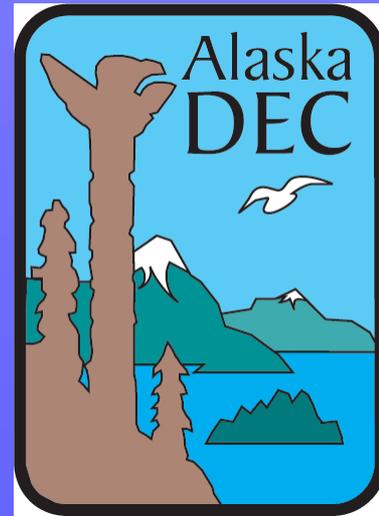
Advanced Monitoring Initiative: Arctic Coastal Data Mining and Assessment Project

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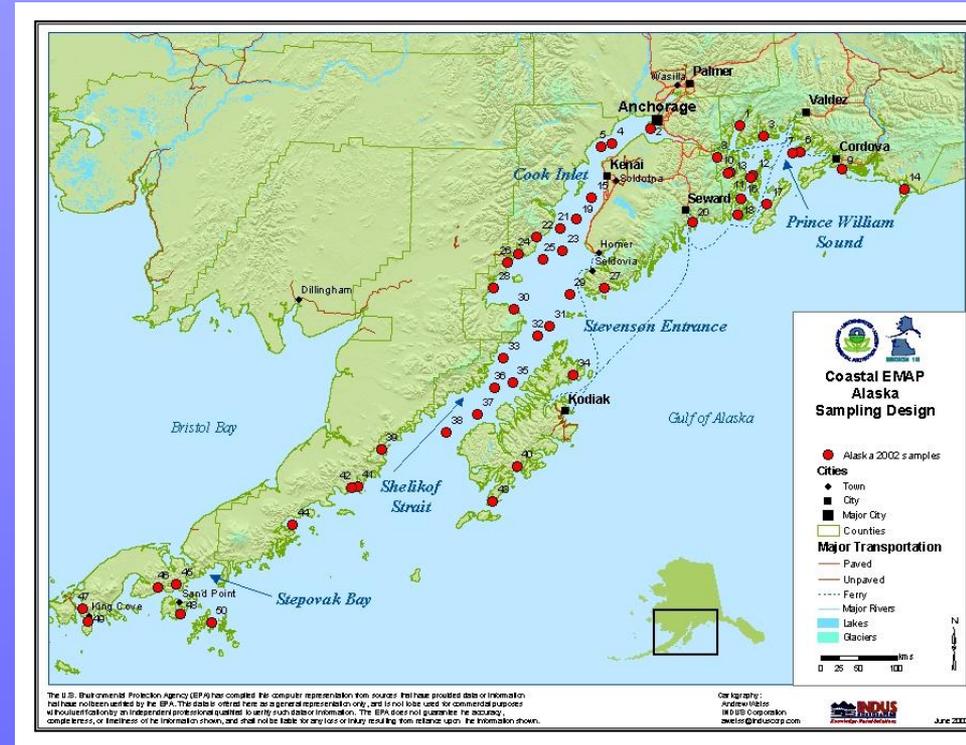


AMI Participants

- *UAF*: Arny Blanchard, A. Sathy Naidu, John Kelley, Steve Jewett
- *ADEC*: Doug Dasher
- *EPA, Region 10*: Dixon Landers, Gretchen Hayslip
- *EPA ORD/National Health and Environmental Effects Research Laboratory (NHEERL)*: Tony Olsen

Background

- Assessment of AK's coastline began in 2002
 - AK Monitoring and Assessment Program (AKMAP)
- Large coastline
 - Broken into regions
 - Sample separately



[http://yosemite.epa.gov/r10/OEA.NSF/Monitoring/Coastal+Study+Areas/\\$FILE/alaska_02.jpg](http://yosemite.epa.gov/r10/OEA.NSF/Monitoring/Coastal+Study+Areas/$FILE/alaska_02.jpg)

• Can we “jump-start” long-term monitoring by examining historical data?

Methods of AMI

- Assess the usability of historic long-term data for conducting *post hoc* AKMAP assessments
- Use GIS to develop a sampling grid that reflects the spatial density of resource characteristics
 - Sample GIS grid using EPA EMAP random survey method to achieve spatially balanced design
 - Summarize results using descriptive measures

What's our process?

AMI Process and QAPP

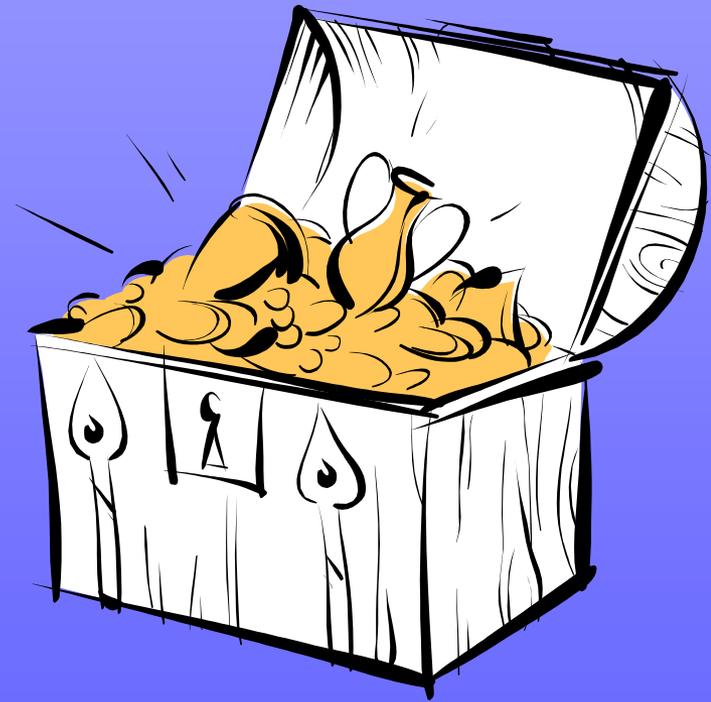
- Acquire ANY datasets by searching reports and publications
 - Enter into electronic spreadsheet
 - Reference and standardize the datasets
- Data validity: must be backed by rigorous and documented QA/QC efforts
- Data usability: Is the dataset indicative of overall status or suggest potential trends in temporal or spatial data?



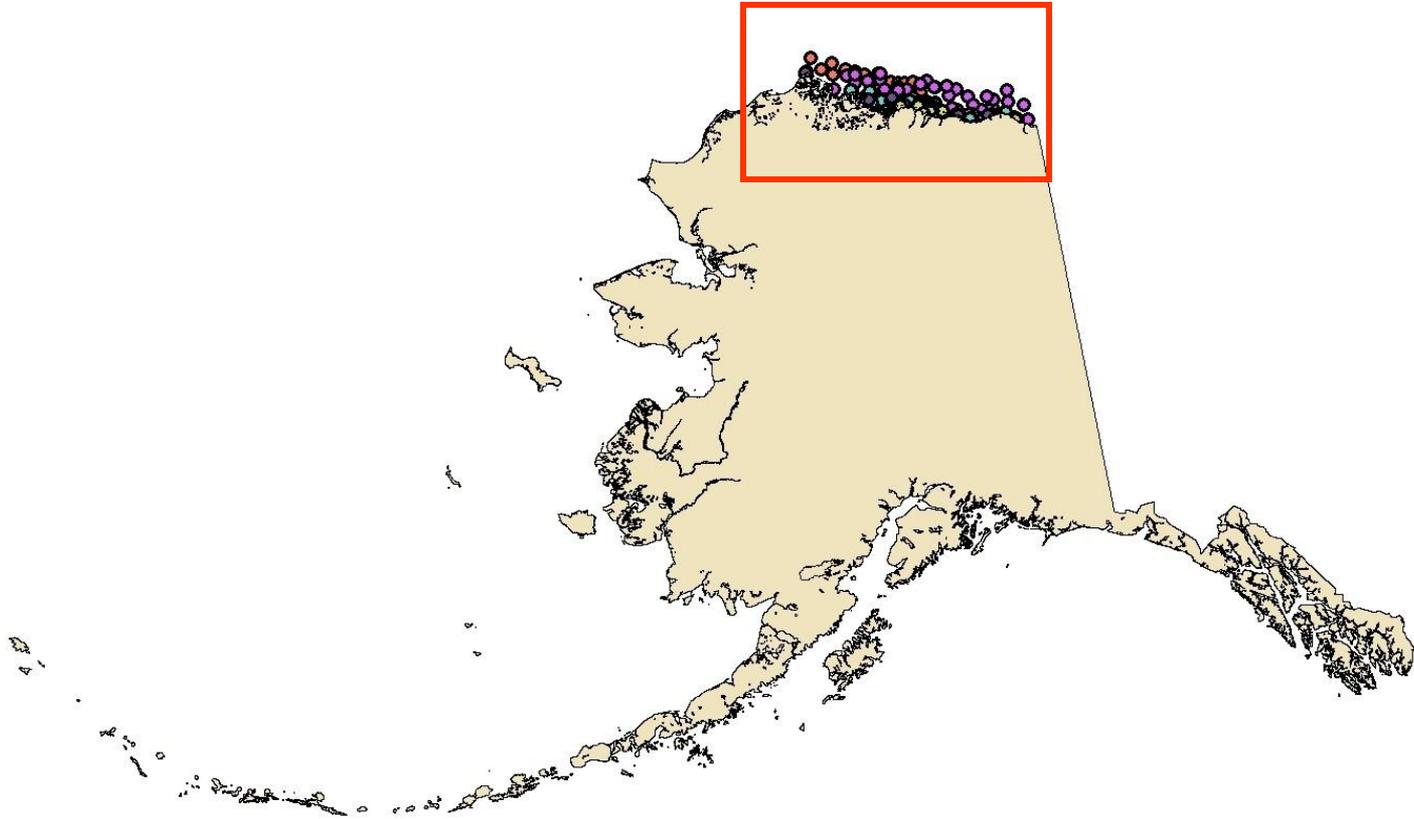
Georeferenced by documented latitudes and longitude

Results of our data-mining

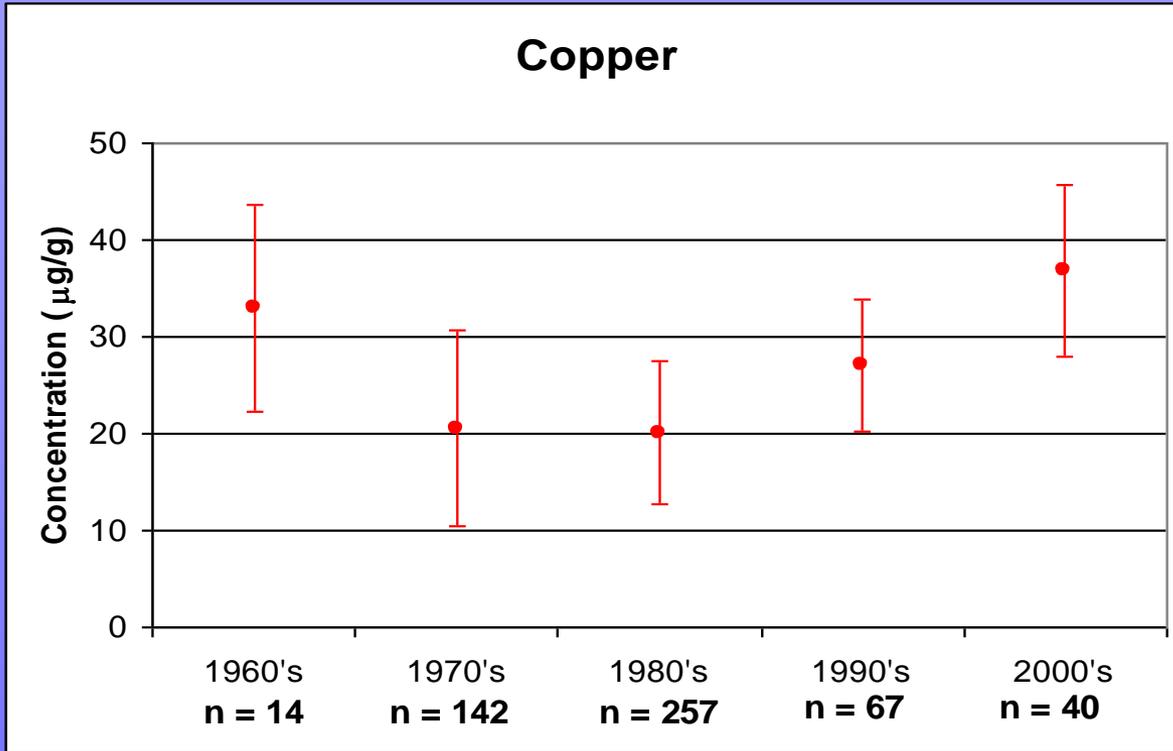
- ~20 reports
- >450 unique stations over time
- ~200 physical variables (sediment)
 - Heavy metals
 - Hydrocarbons
 - Grain size



Stations



Preliminary Data



Long-term trends
apparent

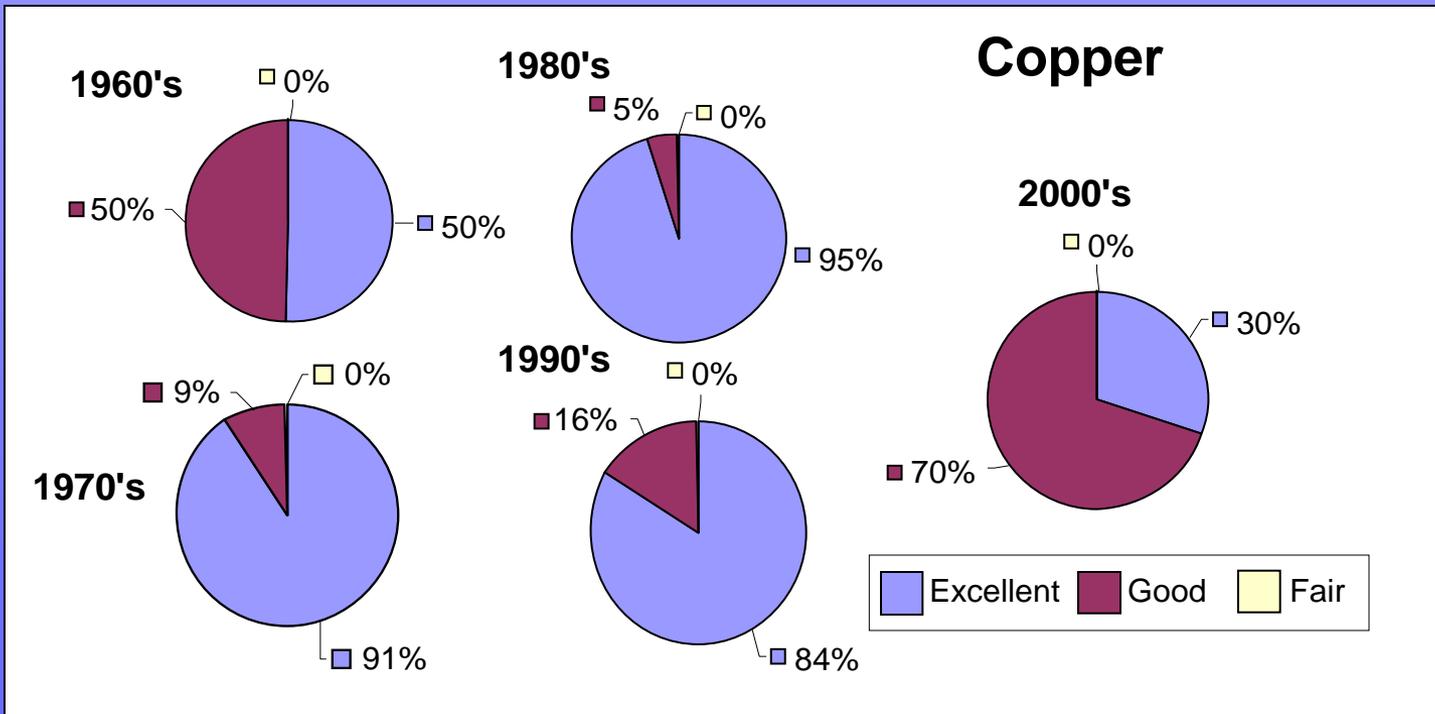
EXAMPLE:

**Environmental Standards
Quality Criteria** (i.e., Long et al.,
1995)

Excellent (µg/g)	Good (µg/g)	Fair (µg/g)
34	270	>270

AMI Output

Compare against sediment quality criteria to determine ecological status of the Beaufort Sea

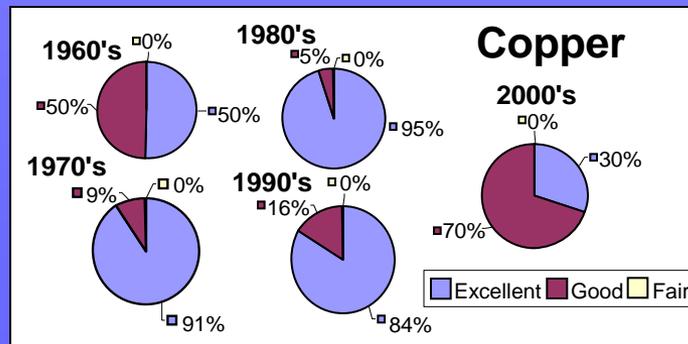
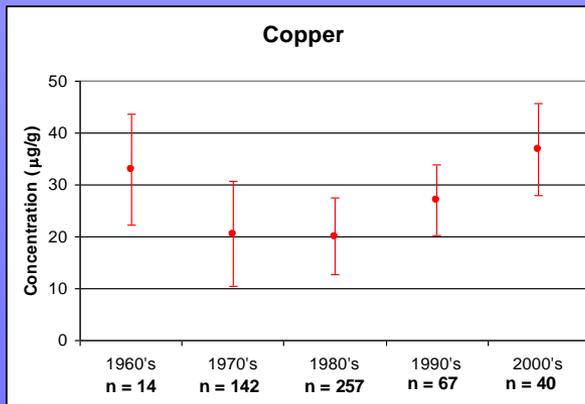


AMI Output

Data
Analysis
Method

Environment
Status

Database



Yea!
It worked!

Microsoft Excel - Heavy Metal Data upd 5 2 07.xls

	A	B	C	D	E	F	G
1	CMI PROJECT DATA						
2	Site	Year	Station	Replicate	Latitude	Longitude	V
3	Elson Lagoon	2001	EL-1	1	71.333	-156.560	211
4	Elson Lagoon	2001	EL-2	1	71.320	-156.541	188
5	Elson Lagoon	2001	EL-3	1	71.292	-156.412	147
6	Elson Lagoon	2001	EL-4	1	71.380	-156.446	168
7	Elson Lagoon	2001	EL-5	1	71.353	-156.515	157
8	Coleville-Delta-Prudhoe Bay	1977	BL1		69.915	-142.383	135
9	Coleville-Delta-Prudhoe Bay	1977	BL2	1	69.920	-142.362	130
10	Coleville-Delta-Prudhoe Bay	1977	BL4	1	69.900	-142.325	140
11	Coleville-Delta-Prudhoe Bay	1977	BL4D	1	69.900	-142.325	135
12	Coleville-Delta-Prudhoe Bay	1977	BL9	1	69.877	-142.197	120
13	Coleville-Delta-Prudhoe Bay	1977	BL10	1	69.863	-142.217	153
14	Coleville-Delta-Prudhoe Bay	1977	BL11	1	69.850	-142.232	170
15	Coleville-Delta-Prudhoe Bay	1977	BL14	1	69.877	-142.232	135
16	Coleville-Delta-Prudhoe Bay	1977	BL14D	1	69.877	-142.232	135
17	Coleville-Delta-Prudhoe Bay	1977	BL15	0	69.875	-142.240	145
18	Coleville-Delta-Prudhoe Bay	1977	BL16	0	69.883	-142.230	135
19	Coleville-Delta-Prudhoe Bay	1977	BL17	0	69.897	-142.283	110
20							
21	Coleville-Delta-Prudhoe Bay	1999	1D/1	0	70.095	-144.090	122
22	Coleville-Delta-Prudhoe Bay	1999	1D/2	1	70.095	-144.090	105
23	Coleville-Delta-Prudhoe Bay	1999	1D/3	2	70.095	-144.090	113
24	Coleville-Delta-Prudhoe Bay	1999	2E/1	0	70.213	-146.193	126
25	Coleville-Delta-Prudhoe Bay	1999	2E/2	1	70.213	-146.193	109
26	Coleville-Delta-Prudhoe Bay	1999	2E/3	2	70.213	-146.193	87
27	Coleville-Delta-Prudhoe Bay	1999	2F/1	0	70.172	-146.033	104
28	Coleville-Delta-Prudhoe Bay	1999	2F/2	1	70.172	-146.033	115
29	Coleville-Delta-Prudhoe Bay	1999	2F/3	2	70.172	-146.033	81
30	Coleville-Delta-Prudhoe Bay	1999	3A/1	0	70.298	-147.092	117
31	Coleville-Delta-Prudhoe Bay	1999	3A/2	1	70.298	-147.092	114
32	Coleville-Delta-Prudhoe Bay	1999	3A/3	2	70.298	-147.092	108
33	Coleville-Delta-Prudhoe Bay	1999	3B/1	0	70.298	-147.038	122
34	Coleville-Delta-Prudhoe Bay	1999	3B/2	1	70.298	-147.038	99
35	Coleville-Delta-Prudhoe Bay	1999	3B/3	2	70.298	-147.038	127
36	Coleville-Delta-Prudhoe Bay	1999	4A/1	0	70.308	-147.670	140
37	Coleville-Delta-Prudhoe Bay	1999	4A/2	1	70.308	-147.670	139
38	Coleville-Delta-Prudhoe Bay	1999	4A/3	2	70.308	-147.670	138

What's next for AMI

- Perform the random sampling of the GIS sample grid
 - Summarize the data using descriptive measures and other statistical means
- Repeat for reports of biological variables
 - Have some reports but not meeting QAPP
 - Continue data-mining of biological datasets
- Create a searchable database of all the datasets
 - Make database available

Conclusions

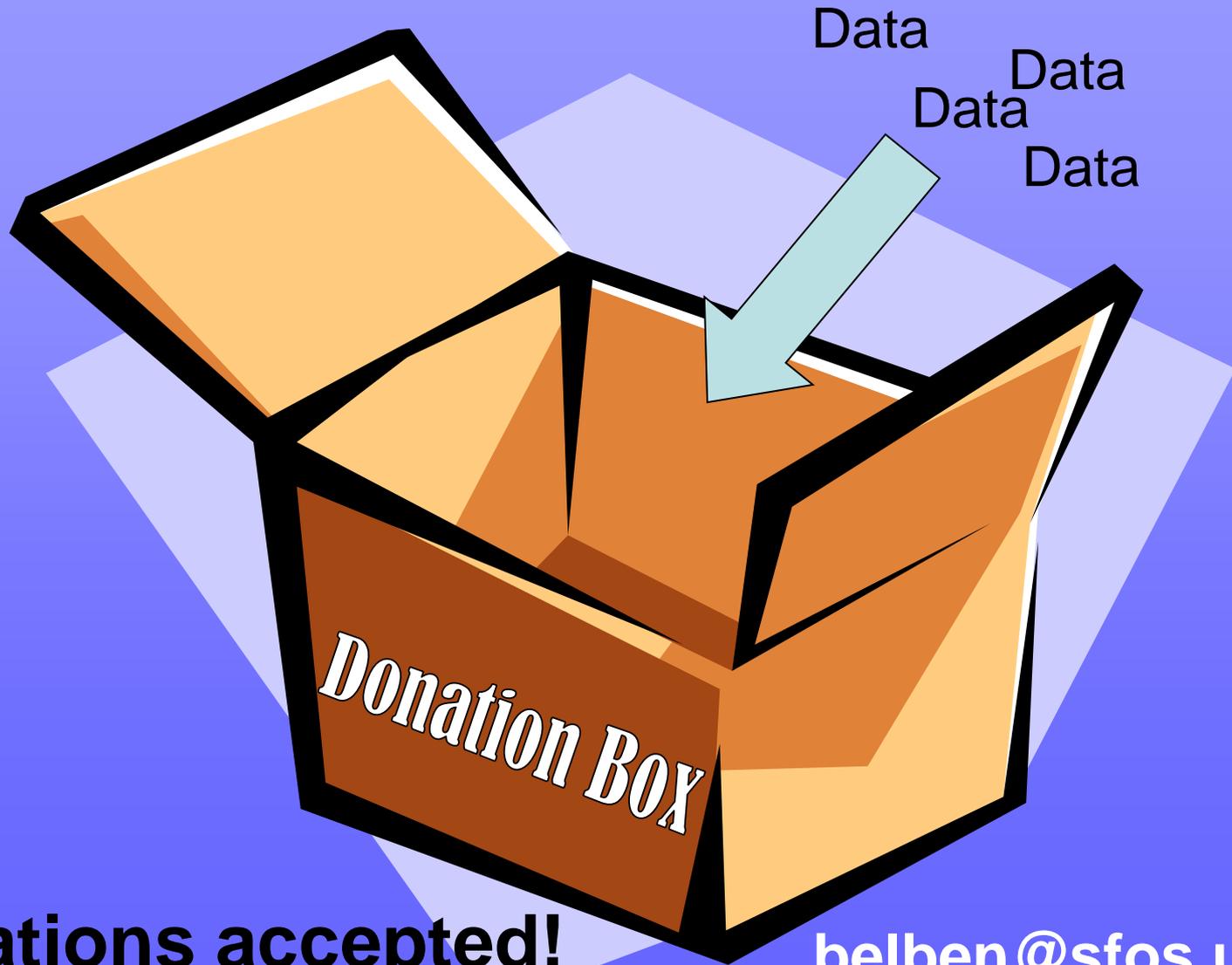
- We can apply the method to other coastal regions
- Gain insights of status on temporal & regional scales
- Add to near-future Beaufort Sea AKMAP study
- Assist with designing future sampling efforts

Acknowledgments

- Funded through EPA Office of Research & Development to ADEC and UAF
- References:
 - Long, E.R., MacDonald, D.D., Smith, S.L., and Calder, F.D., 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Environmental Management*, 19(1): 81-97.

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Questions?



Donations accepted!

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