

Ecological conditions

- ◆ Diverse aquatic plant community
- ◆ Functionally diverse benthic community
- ◆ Diverse fish community
- ◆ Diverse habitat types

Diverse aquatic plant community

- ◆ Shoreline - diverse emergent marshes:
 - ◆ cattail, reeds, and rushes
- ◆ Submerged - diverse stands
 - ◆ eelgrass, pondweed, and milfoil

Functionally diverse benthic community

- ◆ High percentage of filterers
- ◆ High percentage of gatherers

Diverse fish community

- ◆ 22 species
- ◆ Predatory species (e.g. northern pike)
- ◆ Forage species (e.g. minnows and shiners)
- ◆ Sport fish (e.g. northern pike, muskellunge, largemouth bass, yellow perch)

Diverse habitat value

- ◆ Fish

- ◆ Spawning habitat
- ◆ Nursery habitat
- ◆ Feeding habitat

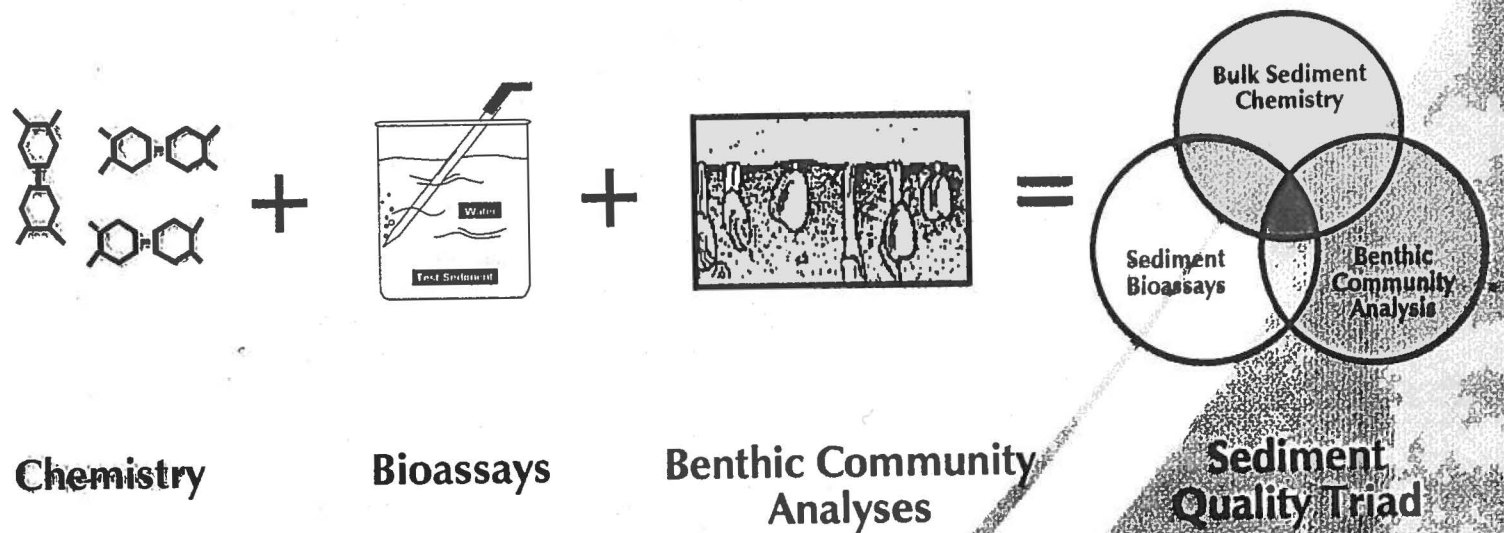
- ◆ Wildlife

- ◆ Foraging
- ◆ Loafing

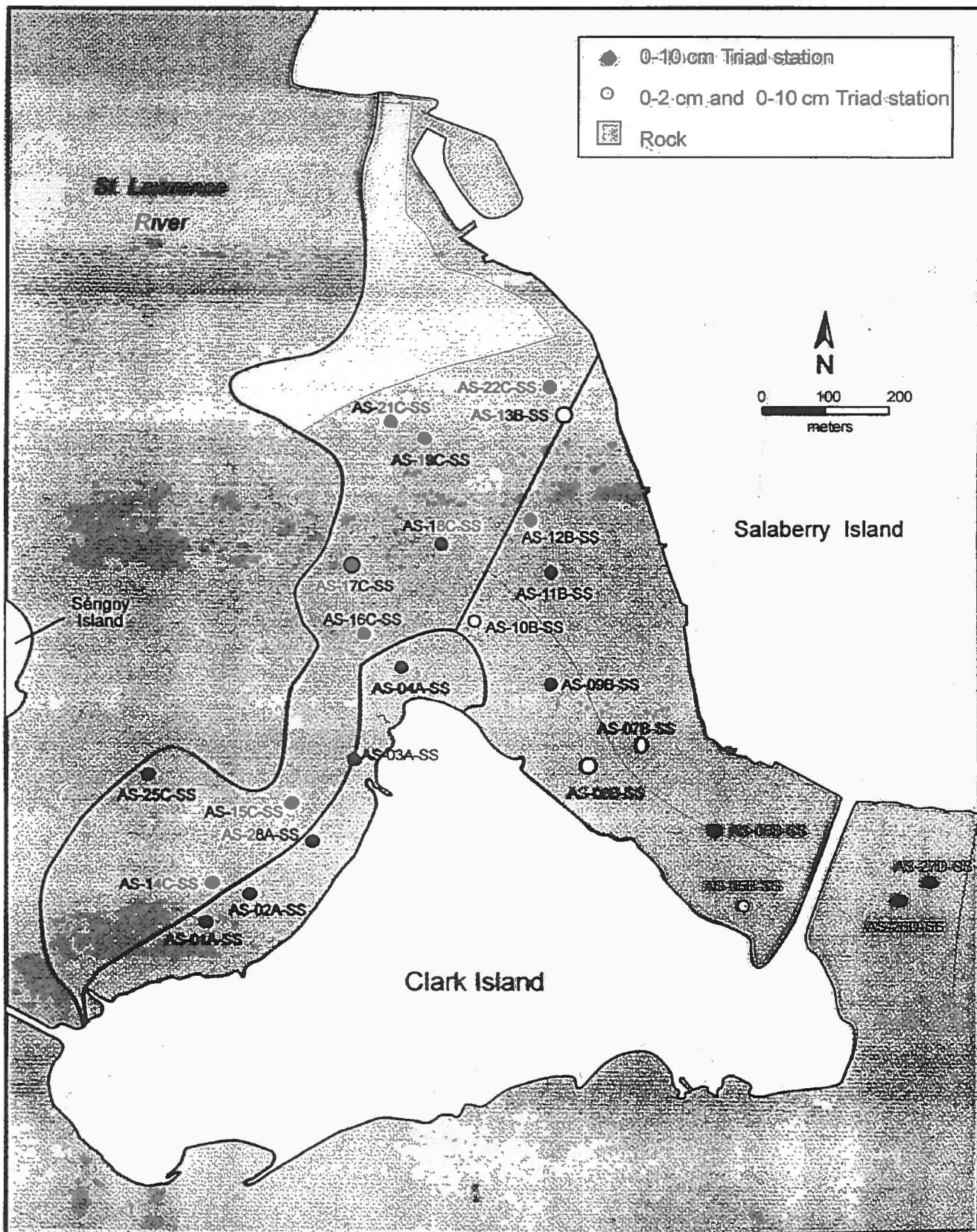
Median Concentrations of Metals in Sediments

	ZONE A	ZONE B	ZONE C	BACKGROUND	LEVEL 3 MENV
As	79	55	12	4	17
Cd	10,0	16,5	2,4	0,9	3,0
Cu	920	460	85	41	86
Hg	2,5	4,9	0,7	0,3	1,0
Pb	65	110	38	21	170
Zn	3000	3900	465	170	540

Overview of the Sediment Quality Triad process



Final locations of Triad sampling stations



Types of samples collected by station

SEDIMENT SAMPLES

STATION	0-10 cm	0-2 cm	POREWATER
	HORIZON	HORIZON	SAMPLES
AS-01A	✓		✓
AS-02A	✓		✓
AS-03A	✓		✓
AS-04A	✓		✓
AS-05B	✓	✓	✓
AS-06B	✓		✓
AS-07B	✓	✓	✓
AS-08B	✓	✓	✓
AS-09B	✓		✓
AS-10B	✓	✓	✓
AS-11B	✓		✓
AS-12B	✓		✓
AS-13B	✓	✓	✓
AS-14C	✓		✓
AS-15C	✓		✓
AS-16C	✓		✓
AS-17C	✓	✓	✓
AS-18C	✓		
AS-19C	✓		
AS-21C	✓		
AS-22C	✓		
AS-25C	✓		
AS-26D	✓		
AS-27D	✓		
AS-28A	✓		✓
AS-01R	✓	✓	
AS-02R	✓	✓	
AS-03R	✓		
AS-04R	✓		
AS-05R	✓		

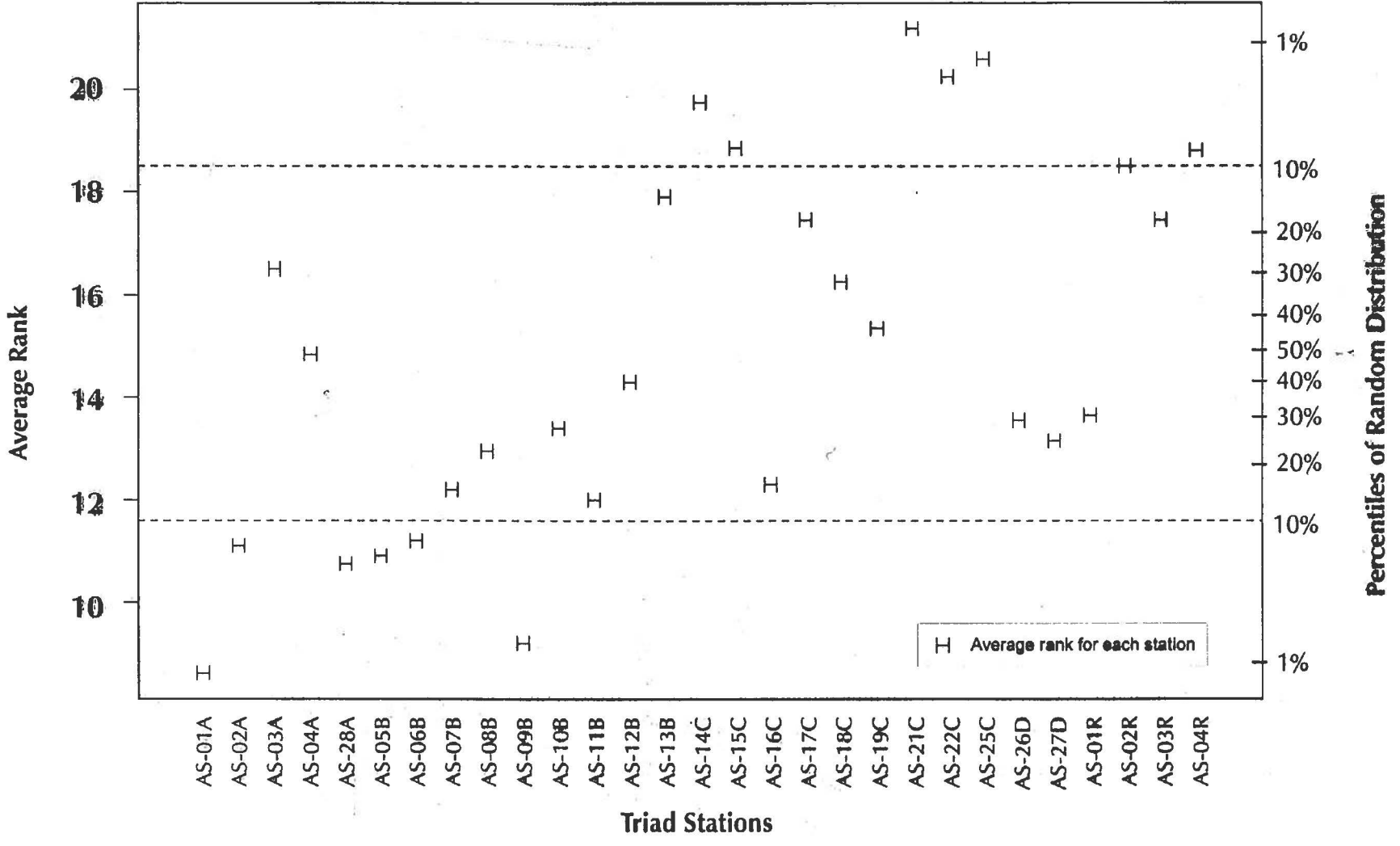
Triad analysis endpoints for sediment quality

TRIAD ELEMENT	RANKING APPROACH
Sediment chemistry	Based on magnitude of exceedances of guideline values
Toxicity tests	Based on measured response for each endpoint: <ul style="list-style-type: none">• <i>H. azteca</i> survival• <i>H. azteca</i> growth• <i>C. tentans</i> survival• <i>C. tentans</i> growth
Benthic community structure	Based on results of each community metric: <ul style="list-style-type: none">• Abundance• Taxa richness• Percent oligochaetes• Percent chironomids• Percent taxa which are chironomids

Ranking method

- ◆ Use absolute performance for 10 endpoints: 5 benthic community, 4 bioassay, and 1 aggregated chemistry
- ◆ Rank stations within each endpoint (1 = worst, 29 = best)
- ◆ Compute and average rank for each station using an equal weight for each endpoint
- ◆ Compare the average rank for each station to the null distribution (Ho: the performance of each endpoint is independent of the others)
- ◆ Identify stations that have uniformly poor performance in all (or most) endpoints, on a relative scale.

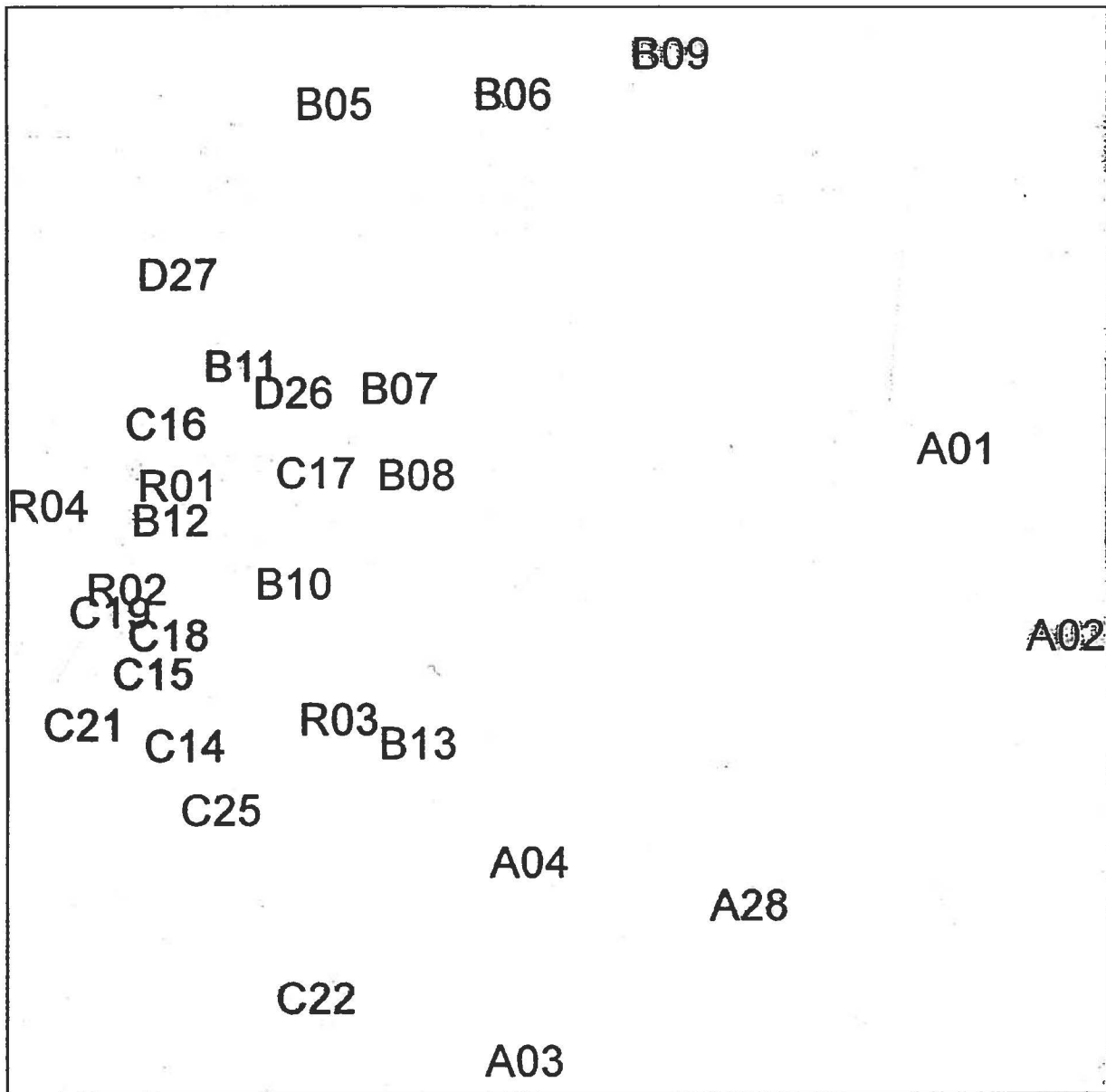
Average ranks for Triad results



Multidimensional scaling

- ◆ Use absolute performance for 10 endpoints: 5 benthic community, 4 bioassay, and 1 aggregated chemistry
- ◆ Remove the effects of widely different scales among the endpoints by using standardized values
- ◆ Calculate the distances between all station pairs
- ◆ Generate a 2-dimensional picture which preserves the distances between station pairs calculated from the original 10 endpoints
- ◆ This picture visually represents the degree to which the “poor” stations are separated from the others

Two-dimensional representation of the 10 Triad endpoints using MDS



Note: station numbers in this diagram are given in the form Study Area + number.
Thus AS-01A becomes A01 and AS-25C becomes C25.

Supporting evidence

- ◆ Sediment porewater
 - ◆ 14 stations sampled
 - ◆ Generally, well below chronic criteria
- ◆ SEM/AVS
 - ◆ At all sampling stations
 - ◆ SEM/AVS generally less than 1

Grades of sediment quality

