

Stream Segment Evaluation Program

Jessica Franks, PhD
Phil Hutchison



Arkansas Experience

2004 Integrated Report
175 stations evaluated

Manual Data Analysis

- Process is time intensive, subjective in nature and has opportunities for math errors
 - Select proper numeric criteria
 - Extreme data values- what to include
 - Values near the numeric criteria- what to count as exceedance
 - Count of the samples
 - Count of the exceedances



Manual Data Analysis (continued)

- Calculate the acceptable number of exceedances
- Decide on impairment
- Review all above to confirm the decision
- Notes in margins of data sheets constitute the record of the decision



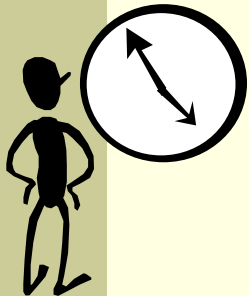
Automated Data Analysis

- Accurate calculations
- No keying errors
- Same standard numeric criteria selected each time
- No selective use of data
- Objective answers



Segment Evaluation Program Benefits

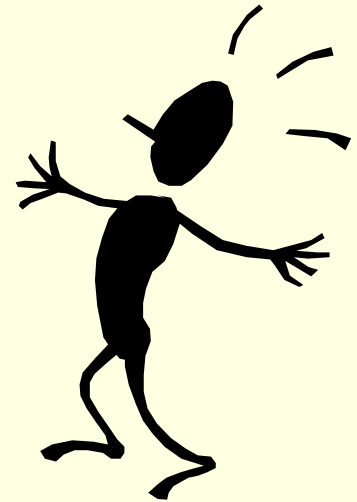
- Automated calculating and assessment decision making tool for use with monitoring data
- Saves labor and time → money
 - 3,100 to 7,200 man hours in data analysis
 - 15,800 to 36,300 man hours in preparing the Integrated Report
- Reduces subjectivity and arbitrariness in the assessments
- Improves quality of the assessments



Segment Evaluation Program Benefits

(Continued)

- Reproducible results
- Cross-reference file invaluable in answering water quality standards questions
- Tool transferable to other states



6-Minute Plan

- Access- 7 Queries and Exports to Excel
- 7 Excel copy from export file - paste to SegEval tab
- Enter segment number on Sheet 6
- Copy from Sheet 4 to Paste Special to Sheet 6
- Click on report tab and review
- Enter comments, print, sign



Segeval.xls Tabs

Microsoft Excel - SEGEVAL_TestEdit.XLS

File Edit View Insert Format Tools Data Window Help Adobe PDF

100% Times New Roman 10 B

D4 =

	A	B	C	D	E	F	G	H
1	StationID	LogNumber	DateCollected	FecalColiform	E_Coli			
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								

bact canions cpmetals field herb pest routine Sheet4 Sheet6

Export Data Options

- Arkansas monitoring data is available on the Web in a Microsoft Access database
- Any tabular data can be pasted to the Microsoft Excel tabs
- Data can be typed directly into the Microsoft Excel tabs

Automated Edits

- Eliminate hand correcting data entries
 - Excel treats all information from Access as text. Fix-multiply by 1
 - Monitoring data quirks- void, less than, question marks
 - Replace hardness values (mg/l) < 25 and > 400 with 25 or 400

Cross Tab

- Cross index reference file embedded in the Segeval.xls
- Stores the numeric criteria and acceptance criteria for each segment
- Pulls data associated with segment number entered on Sheet 6
- Advises proper segment number to be used for a monitoring station
- Allows segments to be evaluated against data from a monitoring station not on the segment

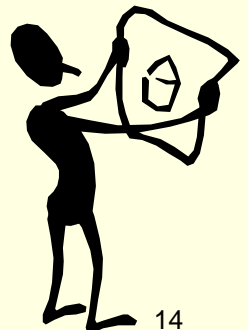
How SegEval.xls Works

- Extracts from the Cross Tab
 - Uses
 - Numeric criteria
 - Screening percentages
- Moves data from input tabs and cleans the inputs
- Calculates site specific acute and chronic numeric criteria for parameters that have equations rather than constants



How SegEval.xls Works (continued)

- Determines if sample values meet the numeric criteria
- Counts exceedances of the numeric criteria
- Determines if there are more than the acceptable number of exceedances based on the screening percentage and sample size
- Calculates statistics
- Organizes information on the report



Report: Complete Assessment on a Single Page

- Parameters arranged by Use
- Group number assigned based on impairment and sample size
- Displays calculated statistics, numeric criteria and screening percentages
- Second page of report only shows impaired groups
- Comment section



Report – Top Page 1

Microsoft Excel - SEGEVAL_OUA159.XLS

File Edit View Insert Format Tools Data Window Help Adobe PDF

100% Times New Roman 9 B I U

H8 =

	A	B	C	D	E	F	G	H	I	J	K
1	Report of Segment-Reach 8040102001, Ouachita R., which has a segment length of 15.6 miles.										
2	Analysis based on monitoring station use 8040201005. The segment is in planning segment 2F in ecoregion GULF.										
3	Evaluate segment(s) Analyze using 8040201005 with the segment listed above. 5/2/2006 10:42										
4	Primary Contact Recreation Use										
5	Sample Count	Screen Count	Exceedance Count	Use not evaluated. Too few samples were collected to determine supporting/non-supporting.							
6	0	0	0	Fecal Coliform							
8	Secondary Contact Recreation Use										
9	Sample Count	Screen Count	Exceedance Count	Use not evaluated. Too few samples were collected to determine supporting/non-supporting.							
10	1	1	0	Fecal Coliform							
12	Fisheries-Streams Use										
13	Acute Sample Count	Acute Screen Count	Acute Exceedance Count	Chronic Sample Count	Chronic Screen Count	Chronic Exceedance Count	Parameter	Acute Analysis	Chronic Analysis		
14	NA	NA	NA	10	1	0	Critical Season DO	NA	Use supported. Grp 3.		
15	NA	NA	NA	34	4	0	Primary Season DO	NA	Use supported. Grp 1.		
16	NA	NA	NA	48	5	12	Ph	NA	Not supported. Grp 2.		
17	NA	NA	NA	51	6	0	Water Temperature	NA	Use supported. Grp 1.		
18	NA	NA	NA	34	4	34	Beryllium	NA	Not supported. Grp 2.		
19	34	2	2	34	4	2	Cadmium	Use supported. Grp 1.	Use supported. Grp 1.		
20	34	2	0	34	4	0	Chromium	Use supported. Grp 1.	Use supported. Grp 1.		
21	34	2	3	34	4	3	Copper	Not supported. Grp 2.	Use supported. Grp 1.		
22	34	2	0	34	4	2	Lead	Use supported. Grp 1.	Use supported. Grp 1.		
23	34	2	0	34	4	0	Nickel	Use supported. Grp 1.	Use supported. Grp 1.		

cpmetals / field / herb / pest / routine / Sheet4 / Sheet6 report / Sheet

Draw AutoShapes

Select destination and press ENTER or choose Paste

NUM

Start Je... sn... Sc... se... P... Mi... 10:43 AM

Report – Bottom Page 1

Microsoft Excel - SEGEVAL_OUA159.XLS

File Edit View Insert Format Tools Data Window Help Adobe PDF

100% Times New Roman 9 B I U

J44 =

	A	B	C	D	E	F	G	H	I	J	K
37	52	2	0	52	13	0	Ammonia	Use supported. Grp 1.		Use supported. Grp 1.	
38	NA	NA	NA	51	6	2	Total Phosphorus	NA		Use supported. Grp 1.	
39	NA	NA	NA	52	8	0	Turbidity - All Flows	NA		Use supported. Grp 1.	
40	NA	NA	NA	20	5	0	Turbidity - Base Flow	NA		Use supported. Grp 1.	
42	Drinking Water Supply Use										
43	Sample Count	Screen Count	Exceedance Count								
44	52	6	0	NO2-NO3			Use supported. Grp 1.				
45	53	6	0	Chloride			Use supported. Grp 1.				
46	51	6	2	Sulfate			Use supported. Grp 1.				
47	53	6	1	TDS			Use supported. Grp 1.				
49	Industrial Water Supply Use					Agricultural Water Supply Use					
50	Sample Count	Screen Count	Exceedance Count								
51	53	6	0	Chloride			Use supported. Grp 1.			45 parameters supported.	
52	51	6	42	Sulfate			Not supported. Grp 2.			7 parameters not supported.	
53	53	6	8	TDS			Not supported. Grp 2.			Count of parameters in GRPs	
55	Grp 1	Supported. 12 or more samples with an acceptable number of exceedances.									23
56	Grp 2	Not supported. 12 or more samples with too many exceedances.									7
57	Grp 3	Supported. 6 samples with an acceptable number of exceedances.									1
58	Grp 4	Not supported. 6 samples with too many exceedances.									0
59	Grp 5	Not evaluated. Less than 6 samples with an acceptable number of exceedances (too small sample size).									21
60	Grp 6	Not supported. Less than 6 samples with too many exceedances for a sample size of 12.									0
61	Report of Segment 8040102001 page 2									5/2/2006 10:42	

cpmetals / field / herb / pest / routine / Sheet4 / Sheet6 / report / Sheet

Draw AutoShapes

Ready NUM

Start Je... sn... Sc... se... P... Mi... 10:46 AM

Report – Top Page 2

Microsoft Excel - SEGEVAL_OUA159.XLS

File Edit View Insert Format Tools Data Window Help Adobe PDF

100% Times New Roman 9 B I U

K67 =

	A	B	C	D	E	F	G	H	I	J	K
61	Report of Segment 8040102001 page 2.									5/2/2006 10:42	
62	Designated uses for this Segment:										
63											
64	Primary Contact Recreation				Secondary Contact Recreation			Fisheries-Streams			
65	Drinking Water Supply				Industrial Water Supply			Agricultural Water Supply			
66											
67	BDL Sampl e	Acute Screen Count	Acute Screen Value	Chronic Screen %	Chronic Screen Value	Chronic Exceedance %	Parameter	Acute Analysis	Chronic Analysis		
68	NA	NA	NA	25%	400		Primary Contact- Fecal Coliform				
69	NA	NA	NA	25%	2000	0%	Secondary Contact- Fecal Coliform				
70	NA	NA	NA	10%	5	0%	Critical Season DO				
71	NA	NA	NA	10%	5	0%	Primary Season DO				
72	NA	NA	NA	10%	6-9	25%	Ph			Not supported. Grp 2.	
73	NA	NA	NA	10%	32	0%	Water Temperature				
74	20	NA	NA	10%	0.076	100%	Beryllium			Not supported. Grp 2.	
75	22	2	varies	10%	varies	6%	Cadmium				
76	24	2	varies	10%	varies	0%	Chromium				
77	5	2	varies	10%	varies	9%	Copper			Not supported. Grp 2.	
78	32	2	varies	10%	varies	6%	Lead				
79	5	2	varies	10%	varies	0%	Nickel				
80	33	2	varies	10%	20	3%	Selenium				
81	NA	1	varies	NA	NA	NA	Silver				
82	0	2	varies	10%	varies	29%	Zinc			Not supported. Grp 2.	
83	0	1	2	10%	0.08		Hexachlorocyclohexane				

cpmetals / field / herb / pest / routine / Sheet4 / Sheet6 / report / Sheet

Draw AutoShapes

Ready NUM

Start J. S. S. S. P. M. M. 10:50 AM

Report – Bottom Page 2

Microsoft Excel - SEGEVAL_OUA159.XLS

File Edit View Insert Format Tools Data Window Help Adobe PDF

100% Times New Roman 9 B I U

J99 =IF(F45="Not supported. Grp 2.",F45,IF(F45="Not supported. Grp 4.",F45,IF(F45="Not supported. Grp 6.",F45,""))

	A	B	C							
94	32	NA	NA	10%	0.1	4%	Total Phosphorus			
95	1	NA	NA	15%	32	0%	Turbidity - All Flows			
96	1	NA	NA	25%	21	0%	Turbidity - Base Flow			
97							Drinking Water			
98	0	NA	NA	10%	10	0%	NO2-NO3			
99	0	NA	NA	10%	250	0%	Chloride			
100	0	NA	NA	10%	250	4%	Sulfate			
101	0	NA	NA	10%	500	2%	TDS			
102							Ecoregion- Industry & Ag			
103	0	NA	NA	10%	50	0%	Chloride			
104	0	NA	NA	10%	40	82%	Sulfate			Not supported. Grp 2.
105	0	NA	NA	10%	150	15%	TDS			Not supported. Grp 2.
107	Comments:									
109	Grp 1	Supported. 12 or more samples with an acceptable number of exceedances.								
110	Grp 2	Not supported. 12 or more samples with too many exceedances.								
111	Grp 3	Supported. 6 samples with an acceptable number of exceedances.								
112	Grp 4	Not supported. 6 samples with too many exceedances.								
113	Grp 5	Not evaluated. Less than 6 samples with an acceptable number of exceedances(too small sample size).								
114	Grp 6	Not supported. Less than 6 samples with too many exceedances for a sample size of 12.								

cpmetals / field / herb / pest / routine / Sheet4 / Sheet6 report / Sheet

Draw AutoShapes

Ready NUM

Start

10:56 AM

SegEval Evolves

- Standards change
- Methodologies change
- Data Quality changes
- New data sources
- New decisions

Transferability

- Tool is transferable to other States
- Oklahoma and Texas have shown an interest in automated assessments

Questions



Contacts:

Jessica Franks

email: Franks.Jessica@epa.gov

Phil Hutchison

email: Hutchison.Philip@epa.gov²²