

Illinois Coastal Water Quality Trends Analysis

Advisory Group
Virtual Meeting

June 25, 2020



Water Quality Trends Analysis Overview

- Grew out of Illinois Coastal Nonpoint Program Approval Process
 - Determine water quality trends to help determine what management actions are needed where
 - Identify what is needed to identify “unknown” sources and causes of water quality impairments
- Two Parts to the Effort
 - Water Quality Database and Model
 - Water Quality Data Monitoring, Collection and Analysis Visioning

Water Quality Database and Model

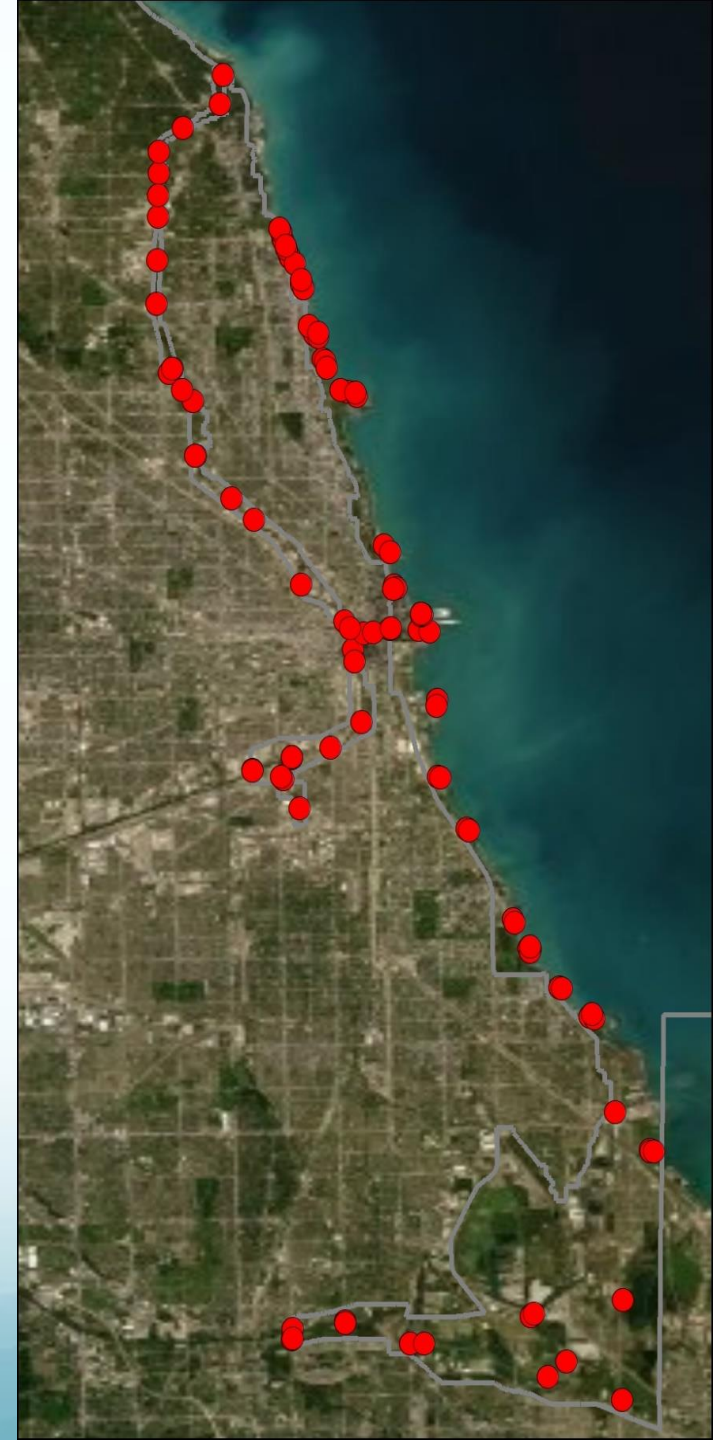
- Illinois State Water Survey (ISWS) effort funded by Illinois Coastal Program
- Using a model that incorporates the IEPA 2018 Integrated Water Quality Report to identify the impairments for different waterways.
- ISWS collecting and formatting data available from different agencies and organizations.
- Next step is an exploratory data analysis, identifying data gaps, over time, parameters and location.
- If there is enough data, the full model can be implemented using time series data.
- Goal is to create a foundation database that can be built upon in the future for more analysis.
- The database and model developed for this current project is based on one used for a trends analysis of the Fox River.

Water Quality Data Monitoring, Collection and Analysis Visioning

- Examine ways that we can understand better
 - What is happening in the environment
 - How we set water quality goals and priorities in the next five years
 - How to identify more effective approaches to monitoring and data analysis
- Identify data needs going forward and understand data gaps
 - Information
 - Time
 - Location

Data

- Organization: Mostly just name and URL
- Project: What organization is in charge of it/ name of project/ purpose/ url for Project
- Sample: Date/Time, Type(Automated, Grab, Spatial Composite...), Medium (Water),
- Location: Lat/Long, Description, Organization Alias
- Results: Operator (<), Result (10), Reporting Limit (10)
- Result Remarks: list of codes to describe results
- Parameters: Name, Unit



Data Management Roadblocks

- All organizations have errors in data, which is just the nature of working with large amounts of data. They come to light when you are putting them into a database.
 - Transcription Errors: wrong data in column, offset, bad dates
 - reporting limits: listed ones are different than data says
 - inconsistent remark codes
- Helpful Practices:
 - Spreadsheets with little formatting is best (avoid color coding, font changes)
 - Consistency within organization along multiple years
 - always need date/time, location, parameter and units (clearly Labeled)
 - Sort columns before sending them (this weeds out mistakes)

Setting Goals for the Monitoring Vision: Surveying Five-Year Priorities

- How can we make existing environmental data more available and accessible as appropriate?
- How can we improve monitoring efforts to get a better water quality data?
- How can we develop a framework to better analyze and characterize water quality?

Survey

- Survey questions developed from the visioning document that was sent as background to the first Advisory Group Call
- 17 responses (out of 29)
- The general themes that came out of the survey are similar to the themes that came out during interviews/discussions with advisory group members over the last three months

What's Do People Think Are Lower Priority Over the Next Five Years?

- Crowdsourced water quality data
- Organized private efforts to collect water quality data
- Artificial Intelligence technologies

What's Do People Think Are Higher Priority Over the Next Five Years

- Need more consistency in water quality dataset formats
- Need more high quality data
- Need to look at collecting appropriate automated data
- Need to make more data accessible
- Need more timely interpretation of data
- Need to better understand water quality trends over time

Next Steps

- Awaiting ISWS Trends Model Analysis
 - Complete data formatting
 - Complete data model analysis
- Data Analysis Gaps
 - Identify Gaps based after model data formatting completed
 - By Location
 - By Time
 - By Data Type
 - Identify potential useful technologies that might improve data collection
 - Unknown sources and causes in Impaired Waters list
 - Sources and Causes identification Field Guide?

Example: Addressing Kellogg Creek

Kaskaskia River	IL_O-20	0714020409	25	5	25.25	N582, N583, N584, N585, F590	84, 388, 403, 462, 274, 260, 400	4, 72, 144, 156, 177, 10, 140
Kaskaskia River	IL_O-25	0714020209	24	5	14.65	N582, N583, N584, X585, F590	322, 274, 376	144, 156, 10, 140
Kaskaskia River	IL_O-30	0714020409	25	5	13.3	N582, N583, N584, N585, F590	260, 322, 371, 388, 403, 462, 274, 99, 400	140, 144, 10
Kaskaskia River	IL_O-31	0714020102	23	5	5.25	N582, N583, F590	84, 322, 441, 501, 348	20, 140
Kaskaskia River	IL_O-32	0714020111	23	5	6.89	F582, N583, X585, F590	274	10, 140
Kaskaskia River	IL_O-33	0714020206	24	5	15.21	N582, N583, X585, F590	322, 388, 274	140, 10
Kaskaskia River	IL_O-35	0714020102	23	5	15.25	N582, N583, X585, F590	84, 322, 441, 501, 348	20, 140
Kaskaskia River	IL_O-37	0714020102	23	5	7.93	N582, N583, X585, F590	84, 319, 348	20, 140
Kaskaskia River	IL_O-38	0714020206	24	5	21.3	X582, N583, N585, X590	274, 400	10, 140
Kaskaskia River	IL_O-97	0714020409	25	5	8.91	N582, N583, N584, X585, F590	85, 322, 371, 500, 274, 99	144, 156, 20, 142, 10, 140
Keefer Branch	IL_PBKA	0709000704	8	3	2.76	X582, X583, X585, X590	N/A	N/A
Keg Slough	IL_MZB	0708010107	9	3	1.72	X582, X583, X585, X590	N/A	N/A
Keith Creek	IL_PR-01	0709000501	6	5	10.43	X582, X583, N585, X590	400	177
Keith Creek	IL_PR-99	0709000501	6	5	3.44	N582, X583, N585, F590	84, 96, 277, 423, 441, 500, 400	20, 28, 177
Kellogg Creek	IL_QF	0404000201	1	5	6.98	N582, X583, X585, F590	79, 322, 500	28, 140, 20
Kelly Creek	IL_DSQC-01	0713000201	12	5	11.44	N582, X583, X585, F590	84, 260, 322, 371, 403, 501	20, 155, 140, 144
Kent Branch	IL_DAIA	0713001201	18	3	5.94	X582, X583, X585, X590	N/A	N/A
Kent Creek	IL_PS	0709000501	6	5	0.5	F582, X583, N585, X590	400	140
Kentucky Creek	IL_MNJ-01	0706000505	9	5	2.45	N582, X583, X585, X590	463	N/A
Kepple Creek	IL_DGLCA	0713001003	17	3	10.19	X582, X583, X585, X590	N/A	N/A
Kerr Township Creek	IL_BPKR-01	0512010905	29	3	6.71	X582, X583, X585, X590	N/A	N/A
Kersey Creek	IL_DZ3VAA	0713001108	18	3	2.34	X582, X583, X585, X590	N/A	N/A
Kerton Creek	IL_DIA	0713000307	13	3	8.11	X582, X583, X585, X590	N/A	N/A
Kettering Branch	IL_BEFH	0512011210	30	3	5.51	X582, X583, X585, X590	N/A	N/A
Kickapoo Creek	IL_BEN-01	0512011206	30	2	5.47	F582, X583, X585, F590	N/A	N/A
Kickapoo Creek	IL_BEN-02	0512011206	30	2	15.15	F582, X583, X585, X590	N/A	N/A
Kickapoo Creek	IL_DL-01	0713000302	13	5	20.83	F582, N583, N585, F590	274, 348, 400	10, 140

Appendix B-2. Specific Assessment Information for Streams, 2018

Legend

Code	Description
F	Fully Supporting
N	Not Supporting
I	Insufficient Information
X	Not Assessed

USE ID	Use Description
582	Aquatic Life
583	Fish Consumption
584	Public and Food Processing Water Supplies
585	Primary Contact Recreation
587	Indigenous Aquatic Life
590	Aesthetic Quality

Cause ID	Cause Description
1	alpha-BHC
79	Aldrin
84	Alteration in stream-side or littoral vegetative covers
85	Alterations in wetland habitats
91	Ammonia (Un-ionized)
96	Arsenic
99	Atrazine
104	Barium
123	Boron
127	Cadmium
137	Chlordane
138	Chloride
139	Chlorine
154	Chromium (total)
160	Color
163	Copper
177	DDT
181	Debris/Floatables/Trash
198	Dieldrin
203	Dioxin (including 2,3,7,8-TCDD)
213	Endrin
228	Fish-Passage Barrier
229	Fish Kills
234	Fluoride
244	Heptachlor
246	Hexachlorobenzene
260	Iron
267	Lead
268	Lindane
270	Low flow alterations
273	Manganese
274	Mercury
277	Methoxychlor

Cause ID	Cause Description
301	Nickel
308	Ammonia (Total)
313	Nonnative Fish, Shellfish, or Zooplankton
317	Oil and Grease
319	Other flow regime alterations
322	Oxygen, Dissolved
348	Polychlorinated biphenyls
371	Sedimentation/Siltation
375	Silver
376	Simazine
385	Sulfates
388	Temperature, water
390	Terbufos
399	Total Dissolved Solids
400	Fecal Coliform
403	Total Suspended Solids (TSS)
413	Turbidity
423	Zinc
441	pH
452	Nitrogen, Nitrate
462	Phosphorus (Total)
463	Cause Unknown
471	Bottom Deposits
478	Aquatic Plants (Macrophytes)
479	Aquatic Algae
480	Petroleum Hydrocarbons
500	Changes in Stream Depth and Velocity Patterns
501	Loss of Instream Cover
502	Sludge
519	Visible Oil
520	Odor
521	Ethanol

Appendix B-2. Specific Assessment Information for Streams, 2018

Legend

Source ID	Description
2	Acid Mine Drainage
4	Animal Feeding Operations (NPS)
10	Atmospheric Deposition - Toxics
20	Channelization
23	Combined Sewer Overflows
28	Contaminated Sediments
36	Drainage/Filling/Loss of Wetlands
38	Dredging (E.g., for Navigation Channels)
45	Golf Courses
49	Highway/Road/Bridge Runoff (Non-construction)
50	Highways, Roads, Bridges, Infrastructure (New)
56	Impacts from Abandoned Mine Lands (Inactive)
58	Impacts from Hydrostructure Flow
61	Industrial Land Treatment
62	Industrial Point Source Discharge
66	Irrigated Crop Production
69	Landfills
72	Loss of Riparian Habitat
73	Managed Pasture Grazing
82	Mine Tailings
84	Municipal (Urbanized High Density Area)
85	Municipal Point Source Discharges
87	Non-irrigated Crop Production
95	Other Recreational Pollution Sources
102	Petroleum/natural Gas Activities

Source ID	Description
109	Rem Hazardous Waste Sites
115	Sanitary Sewer Overflows (Collection System)
119	Silviculture Harvesting
122	Site Clearance (Land Development or
124	Spills from Trucks or Trains
125	Streambank Modifications/destabilization
126	Subsurface (Hardrock) Mining
127	Surface Mining
130	Unpermitted Discharge (Domestic Wastes)
132	Upstream Impoundments (e.g., PI-566 NRCS)
135	Wet Weather Discharges (Point Source and
140	Source Unknown
142	Dam or Impoundment
143	Livestock (Grazing or Feeding Operations)
144	Crop Production (Crop Land or Dry Land)
149	Sediment Resuspension (Contaminated)
155	Natural Sources
156	Agriculture
157	Habitat Modification - other than
160	Inappropriate Waste Disposal
161	Pesticide Application
177	Urban Runoff/Storm Sewers
178	Coal Mining (Subsurface)
181	Runoff from Forest/Grassland/Parkland

Name	Waterbody Code	Not Assessed for Use Attainment	Meeting Use Attainment	Not Meeting Use Attainment	Causes	Sources	Management Actions	Timeline
Kellogg Creek	IL_QF	Fish Consumption, Primary Contact Recreation	Aesthetic Quality	Aquatic Life	Aldrin, Oxygen Dissolved, Changes in Stream Depth and Velocity Patterns	Contaminated Sediments, Source Unknown, Channelization		
Pettibone Creek	IL_QA-C4	Fish Consumption, Primary Contact Recreation, Aesthetic Quality		Aquatic Life	<u>.alpha.-BHC</u> , Arsenic, Copper, Dieldrin, Endrin, Lead,	Contaminated Sediments		
South Branch Pettibone Creek	IL_QAA-D1	Fish Consumption, Primary Contact Recreation, Aesthetic Quality		Aquatic Life	<u>.alpha.-BHC</u> , Endrin, Heptachlor, Polychlorinated biphenyls	Contaminated Sediments		
South Branch		Fish Consumption, Primary			Aldrin, Chromium (total), DDT	Contaminated Sediments,		

Questions?