



PROJECT: ACCESSING SECTION 319 FUNDING FOR LOCAL COMMUNITIES

Section 319 Project – Funded by IEPA

- 2-year period (2017-2018)
- Partners: MPC, Christopher B. Burke Engineering, and MWRD
- Create supplemental materials focused on water quality for existing MWRD plans
- Ultimate goal: enable communities within these boundaries to be eligible for 319 funding
- **This idea arose from CSC discussions**

Four watersheds

- Cal Sag Channel (IL_H-01) Year (2017)
- Little Calumet River South (IL_HB-01) Year (2017)
- Poplar Creek (IL_DTG-03) Year 2 (2018)
- Lower Des Plaines River (IL_G-03) Year 2 (2018)

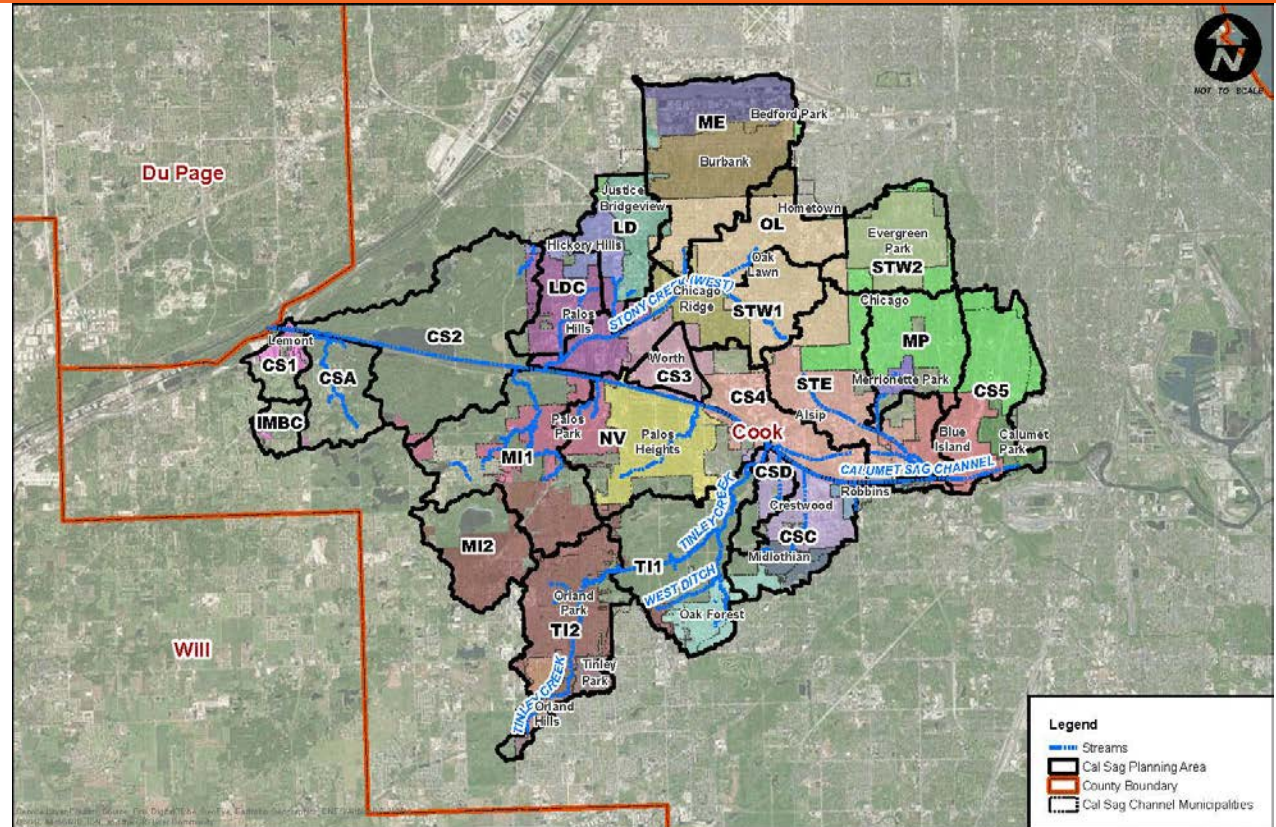
9 Elements

The Plan(s) include:

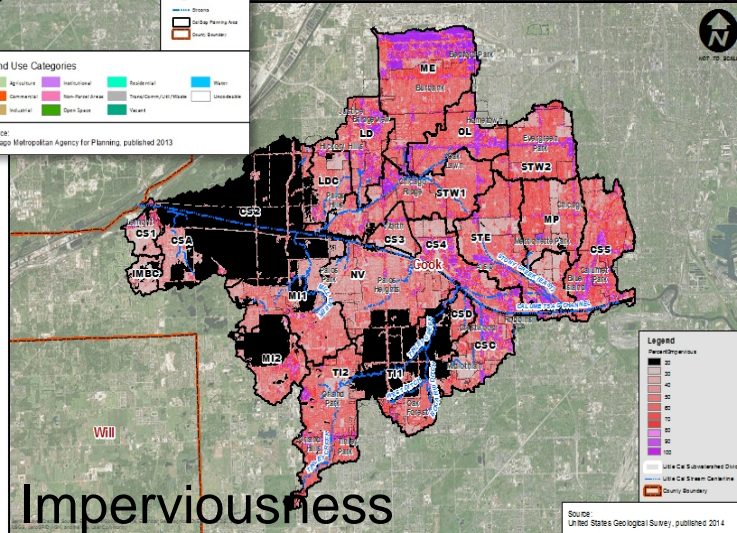
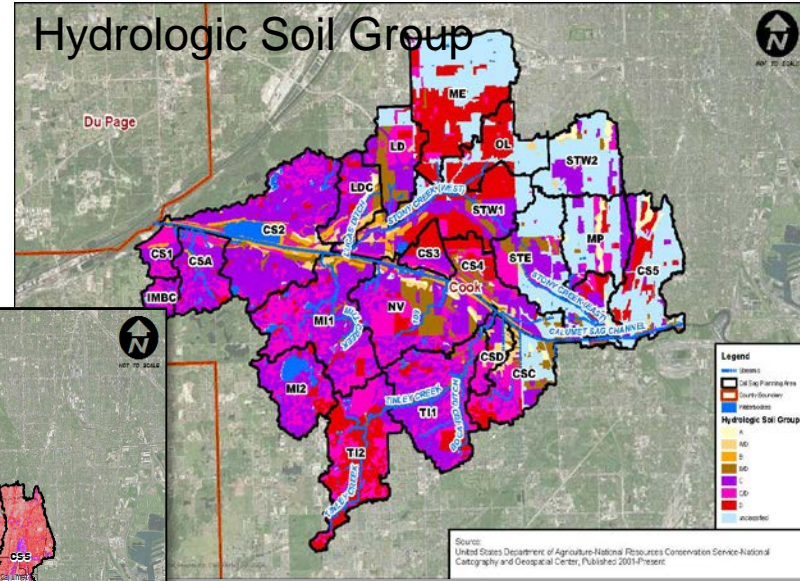
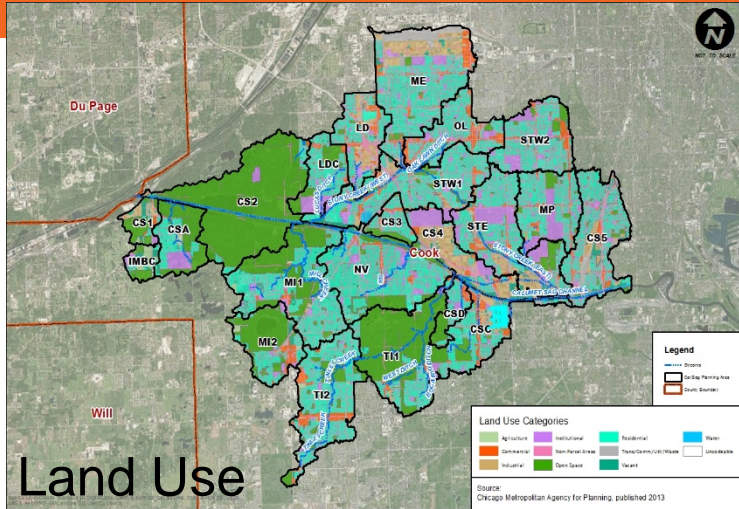
- Identification of cause and sources to be controlled
- Expected load reductions
- Description of non-point source management techniques
- Cost for implementation of the Plan
- Education and outreach activities
- Schedule
- Interim measurable goals
- Criteria for success
- Evaluate effectiveness (including future monitoring)

Watershed Inventories: Cal-Sag Channel

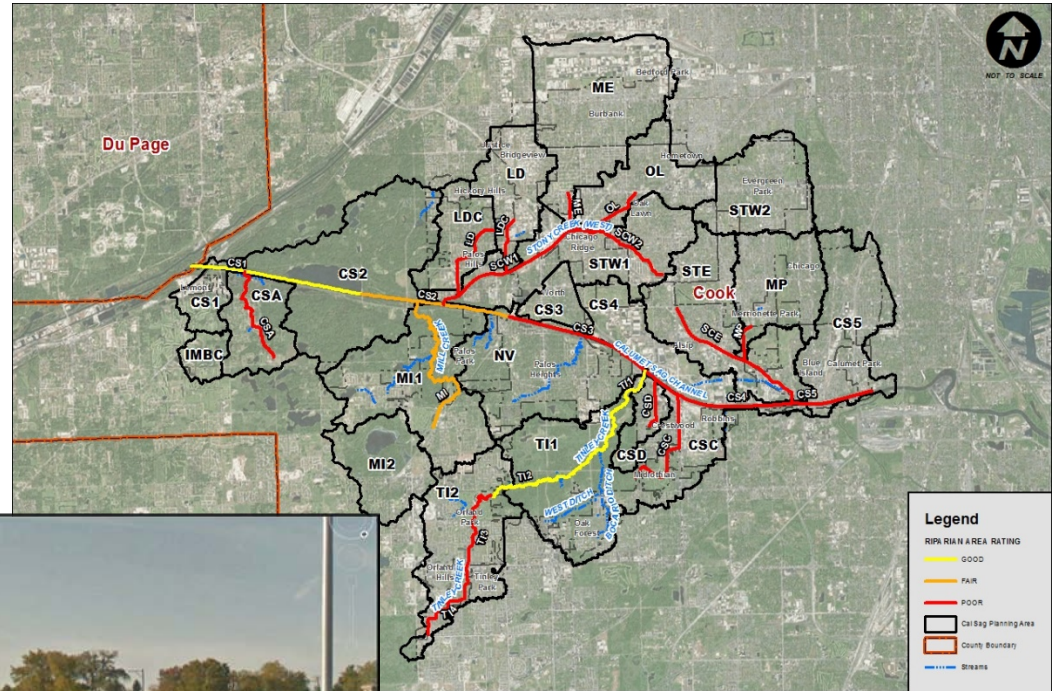
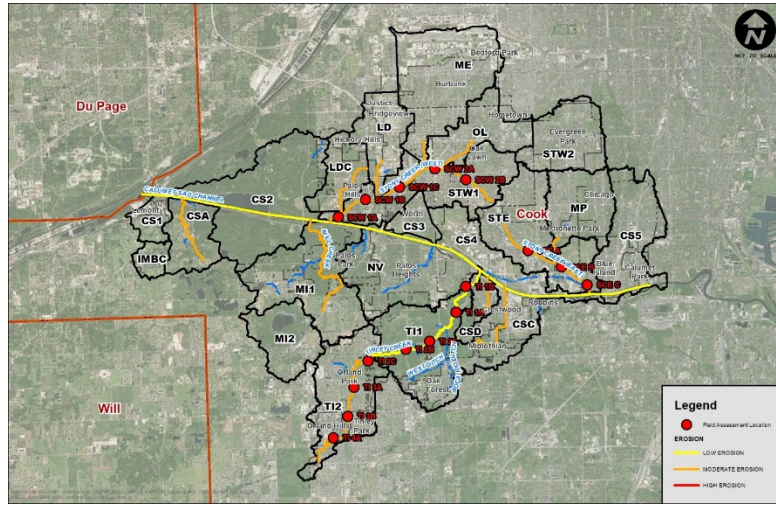
- Alsip Drainage Ditch
- Oak Lawn Ditch
- Lucas Ditch and Cutoff
- Mill Creek
- Navajo Creek
- Melvina Ditch
- Stoney Creek (East and West)
- Tinley Creek



Watershed Inventories: Cal-Sag Channel



Watershed Inventories: Cal-Sag Channel



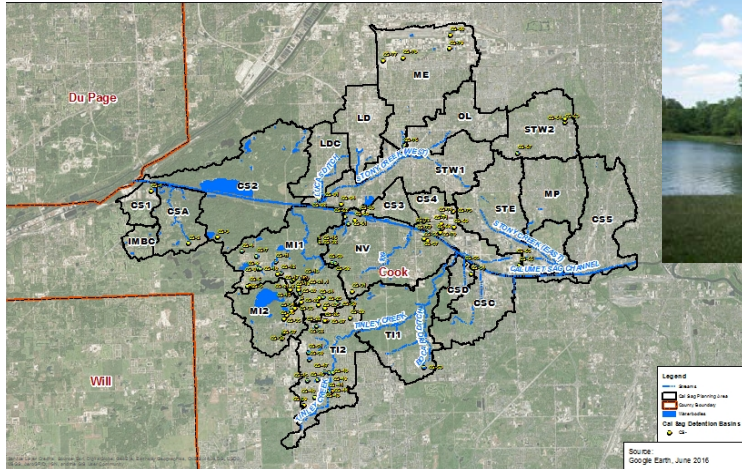
Watercourse assessment

- Channelization
- Riparian corridor
- Erosion

Field assessment



Watershed Inventories: Cal-Sag Channel



Lake Arrowhead



Saganashkee Slough



Lake Oak Lawn

Detention Basin and Lake Assessment

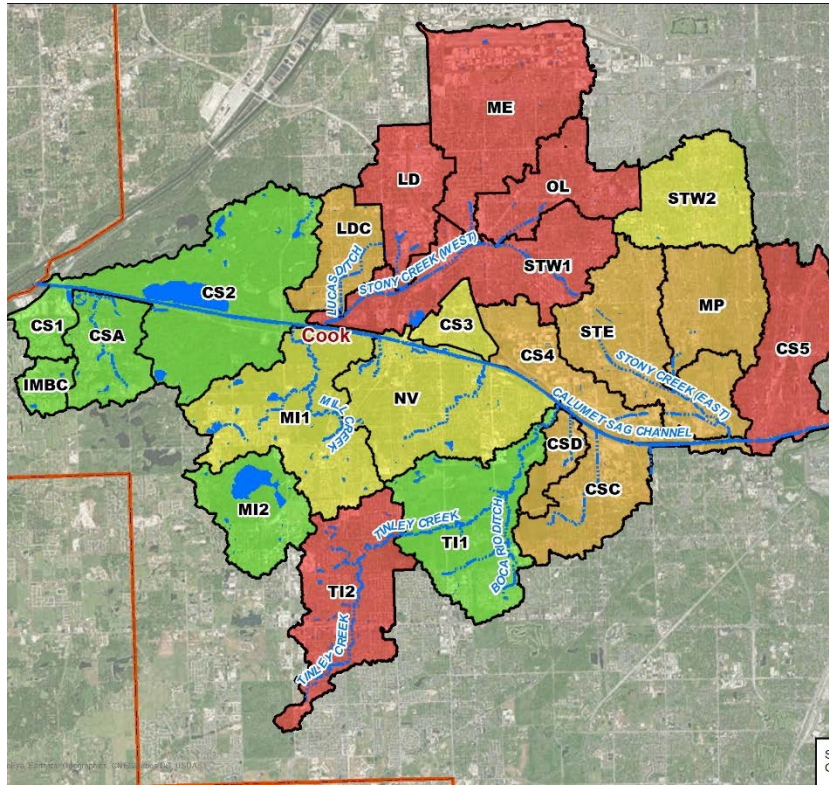
- Riparian corridor
- Erosion
- Open Water or Dry
 - MWRD Basins

Field assessment

Existing Pollutant Loading using STEPL

- Per land use category
 - Nitrogen
 - Phosphorus
 - BOD
 - Total suspended solids
- Chloride as a function of application rate and lane miles
 - Municipality
 - Subwatershed
- Ranked based on 4 quartiles

Priority Areas – Cal-Sag Watershed



Sub	N Load (lb/ac)		P Load (lb/ac)		BOD Load (lb/ac)		Sed Load (t/ac)		Chloride Load (t/ac)		Riparian	Erosion	Rip Score	Sub	Priority Score
STW1	7.8	4	1.42	4	27.2	3	0.56	4	0.27	4	POOR	MOD	3	STW1	22
LD	8.7	4	1.43	4	30.5	4	0.27	3	0.29	4	POOR	MOD	3	LD	22
ME	8.7	4	1.45	4	30.4	4	0.29	3	0.23	3	POOR	MOD	3	ME	21
CS5	8.4	4	1.38	4	29.2	4	0.20	2	0.32	4	POOR	LOW	3	CS5	21
OL	7.9	4	1.31	3	28.9	4	0.30	3	0.35	4	POOR	MOD	3	OL	21
TI2	8.5	4	1.91	4	27.6	4	1.64	4	0.22	3	GOOD	LOW	1	TI2	20
CSD	6.9	3	1.43	4	22.7	2	1.07	4	0.17	2	POOR	MOD	3	CSD	18
CS4	7.8	4	1.231	3	27.6	4	0.18	1	0.15	2	POOR	LOW	3	CS4	17
STE	7.3	3	1.212	3	26.3	3	0.25	2	0.22	3	POOR	MOD	3	STE	17
LDC	6.4	2	1.232	3	22.7	2	0.64	4	0.21	2	POOR	MOD	3	LDC	16
MP	7.1	3	1.195	2	25.9	3	0.23	2	0.26	3	POOR	MOD	3	MP	16
CSC	6.9	3	1.1	2	24.5	3	0.26	2	0.21	2	POOR	MOD	3	CSC	15
STW2	7.4	3	1.215	3	27.2	3	0.17	1	0.29	4	NA	NA	0	STW2	14
CS3	6.7	2	1.1	2	23.8	2	0.16	1	0.30	4	POOR	LOW	3	CS3	14
MI1	5.0	1	1.0	2	17.1	1	0.47	4	0.15	2	FAIR	MOD	2	MI1	12
NV	6.6	2	1.159	2	23.4	2	0.36	3	0.22	3	NA	NA	0	NV	12
CSA	3.8	1	0.7	1	13.3	1	0.26	2	0.07	1	POOR	MOD	3	CSA	9
TI1	3.1	1	0.8	1	9.6	1	0.62	4	0.10	1	GOOD	LOW	1	TI1	9
CS1	5.5	2	0.8	1	18.0	2	0.15	1	0.05	1	GOOD	LOW	1	CS1	8
IMBC	5.1	1	0.9	1	15.2	1	0.30	3	0.03	1	NA	NA	0	IMBC	7
CS2	0.7	1	0.2	1	2.4	1	0.02	1	0.05	1	FAIR	LOW	2	CS2	7
MI2	3.7	1	0.6	1	13.3	1	0.10	1	0.11	1	NA	NA	0	MI2	5

Overall Characterizations

- When compared to other watersheds in Northeastern IL with approved plans, nonpoint source loadings are on average greater in the Cal-Sag Planning Area for all constituents
- The Cal-Sag Planning Area is approximately 90%-95% developed excluding forest preserve areas
- A strong correlation exists between impervious area cover and degradation of aquatic ecosystems in receiving waters
- **BMPs are needed to address urban runoff and reduce stormwater volumes and pollutant loads**

BMPs and Nonpoint Source Management Measures

- Detention basin retrofits
 - Introduction of forebays
 - Turf grass to native
 - Wetland bottom enhancement
 - Conversion to wet bottom
- Biorientation and vegetated swales
- Filter strips
- Permeable pavement
- Manufactured BMP structures
- Stream or channel restoration
- Riparian corridor/buffer restoration
- Floating wetlands
- Chloride reduction strategies

Best Management Practice	Unit	Unit Cost
<u>Bioretention</u> (Rain Gardens / Planter Boxes / Landscaped Medians) @ ~ \$4/ft ²	Ac	\$172,500
<u>Bioretention</u> as Green Roof (assuming structurally sound) @ ~ \$30/ft ²	Ac	\$1,307,000
<u>Dry Detention</u> as Blue Roof (assuming structurally sound) @ ~ \$20/ft ²	Ac	\$871,200
<u>Extended Wet Detention</u> (Detention Basin Retrofit - native planting in dry bottom pond)	Ac	\$12,500
<u>Extended Wet Detention</u> (Detention Basin Retrofit - wet bottom pond restoration and bank enhancement)	Ac	\$8,000
<u>Settling Basins</u> (To be included in all detention basin retrofits 4 ft deep) @ ~445 CY / AC @ \$30 / CY	Ac	\$13,500
<u>Porous Pavement</u> @ ~ \$8/ft ²	Ac	\$348,500
<u>Vegetated Filter Strips</u> @ ~ \$3/ft ²	Ac	\$131,000
<u>Infiltration Trench</u> @ ~ \$6/ft ²	Ac	\$261,500
<u>Mechanical BMPs</u> (assuming 1 per 10 acres of tributary area)	Ea	\$10,000
<u>Weekly Street Sweeping</u>	Ac	\$1,000
<u>Water Quality Inlets</u> (does not include maintenance)	Ea	\$350
<u>Wetland Restoration</u>	Ac	\$15,000
<u>Streambank Stabilization</u>	LF	\$130
BMPs not assessed using STEPL		
<u>Streambank Enhancement – Replacement of hardscape with native</u>	LF	\$100
<u>Riparian Corridor Enhancement – Habitat Enhancement and Creation</u>	Ac	\$9,000
<u>Hydraulic Outfall Structure Retrofits with Forebay Retrofits</u>	Ea	\$75,000
<u>Floating Wetlands</u> (quantified as unit(s) per acre of open water)	Ac	\$10,000

BMP Implementation (25%)

Cal-Sag and Little Cal

- The target level of BMP implementation is 25%.
- BMPs were applied to land use categories.
 - Residential
 - Industrial/Commercial
 - Roadway ROW and Transportation Hubs
 - Various – where opportunities exist
 - Streambank and Riparian Corridor Restoration
- BMP Calculator in the STEPL suite was used to determine overall BMP effects.

Cal-Sag BMP Implementation (25%)

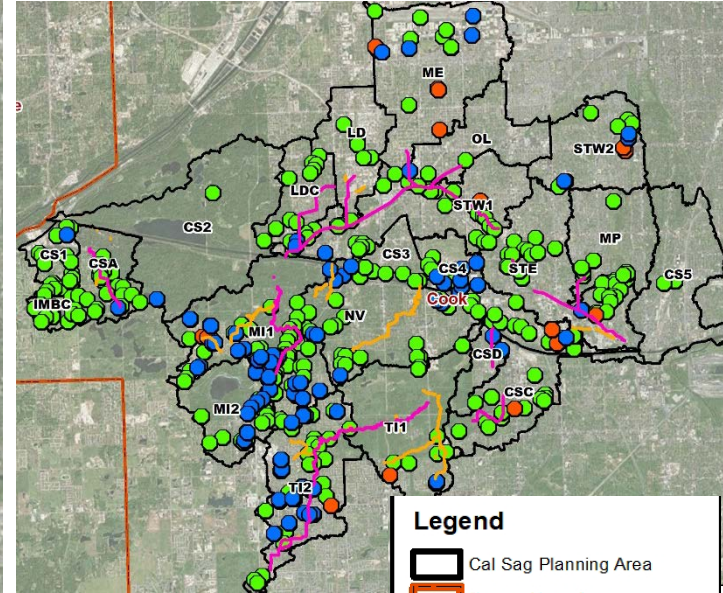
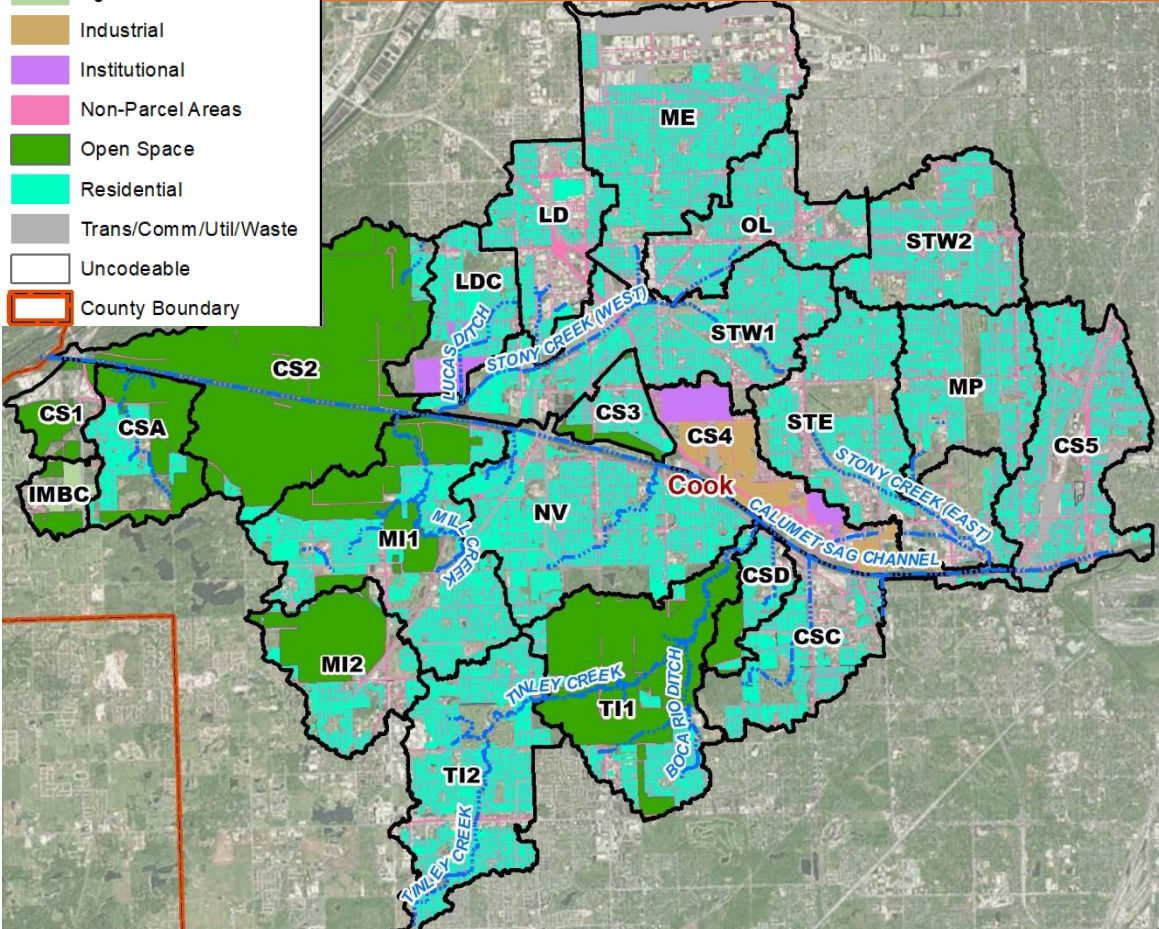
Load Reduction and Cost (Example)

Subwatershed	BMP Type	Amount	Unit	Cost	Load Reduction				Cost to Implement BMP @25%
LD (2,188 acres)	Bioretention (Rain Gardens / Planter Boxes / Landscaped Medians) @ ~ \$4/ft ²	12.0	Ac	\$172,500	Nitrogen Reduced (lbs/year)	Phosphorus Reduced (lbs/year)	BOD Reduced (lbs/year)	Sediment Reduced (tons/year)	\$2,070,000
	Detention Basin Retrofit - native planting in dry bottom pond	0.2	Ac	\$8,000					\$1,920
	Settling Basins	0.02	Ac	\$13,500					\$203
	Porous Pavement @ ~ \$8/ft ²	12.8	Ac	\$348,500					\$4,443,375
	Weekly Street Sweeping	127.5	Ac	\$1,000					\$127,500
	Water Quality Inlets (does not include maintenance)	411.4	Ea	\$350					\$143,990
	Wetland Restoration	2.3	Ac	\$15,000					\$34,613
	Streambank Stabilization	4476.5	LF	\$130					\$581,945
Subwatershed Total					498	82	1,074	57	\$7,403,545

BMP Implementation (25%) – Cal-Sag

Legend

- Cal Sag Planning Area
- Agriculture
- Industrial
- Institutional
- Non-Parcel Areas
- Open Space
- Residential
- Trans/Comm/Util/Waste
- Uncodeable
- County Boundary



Legend

- Cal Sag Planning Area
- County Boundary
- Main Stem Restoration
- Tributary Restoration
- Dry Detention Basin Retrofit
- Wet Detention Basin Retrofit
- Wetland Restoration

Watershed-wide BMP Implementation

- Watershed wide implementation in the **Cal-Sag Planning Area** results in a 17% reduction with an overall cost of \$227 million.
- Sediment load reduction is significant, suggesting a reduction in transport of phosphorus, heavy metals and hydrocarbons.
- As a sensitivity analysis, an analysis equivalent to the 25% implementation level was conducted using a 75% implementation level.
- The higher level of implementation across the subwatersheds is impracticable given the costs.

Implementation Rate	Nitrogen Reduction (lbs/yr)	Phosphorus Reduction (lbs/yr)	BOD Reduction (lbs/yr)	Sediment Reduction (tons/yr)	Cost (\$ Million)
25%	4%	5%	2%	17%	\$227
75%	11%	15%	7%	49%	\$680

Milestone and Implementation Evaluation

Example Subwatershed

Subwatershed	BMP Type	Target Amount	Unit	2-Year Goal	5-Year Goal	10-Year Goal	25-Year Goal	Sediment Reduction Achieved (tons/yr) by Year 25
LD (2,188 acres)	Bioretention (Rain Gardens / Planter Boxes / Landscaped Medians) @ ~ \$4/ft ²	12.0	Ac	0.48	1.92	4.8	12	
	Detention Basin Retrofit - native planting in dry bottom pond	0.2	Ac	0.008	0.032	0.08	0.2	
	Settling Basins	0.02	Ac	0.0008	0.0032	0.008	0.02	
	Porous Pavement @ ~ \$8/ft ²	12.8	Ac	0.512	2.048	5.12	12.8	
	Weekly Street Sweeping	127.5	Ac	5.1	20.4	51	127.5	
	Water Quality Inlets (does not include maintenance)	411.4	Ea	16.456	65.824	164.56	411.4	
	Wetland Restoration	2.3	Ac	0.092	0.368	0.92	2.3	
	Streambank Stabilization	4476.5	LF	179.06	716.24	1790.6	4476.5	
Subwatershed Total								57

Funding Sources

- IEPA Section 319
- MWRD Green Infrastructure Assistance Program
- EPA Clean Water State Revolving Fund (CWSRF)
- National Fish and Wildlife Foundation
 - Chi-Cal Rivers Fund
 - Five Star and Urban Waters Restoration Program
 - Environmental Solutions for Communities
- Local Program Initiatives (e.g., MS4 communities)

Tracking Plan Implementation

- One idea would be for municipalities and other stakeholders in the watersheds to report to MWRD on projects undertaken and completed
- MWRD currently maintains an extensive database of permits issued including BMP acreage
- Interested in other ideas about tracking implementation

CSC Input Requested

- What green infrastructure/non-pipe, stormwater-related projects are you aware of within these two watersheds?
- What information or elements presented in other watershed based plans have been most helpful/useful to your work in the past? Why?
- Initial reactions to using a 25% Implementation Rate for a 17% reduction in TSS loadings at the cost of \$227M over 25-years?
- What does a 17% reduction in TSS loadings mean for water quality rebound?

Thank You.

Please contact us with ideas,
questions or materials:

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