



Stormwater Management Action Plan

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Stormwater Management Action Plan

How can we reach future population & development targets while accomplishing our water quality goals?

Where should we invest stormwater management resources to make the greatest impact?



Stormwater Management Action Plan

How can we reach future population & development targets while accomplishing our water quality goals?

Where should we invest stormwater management resources to make the greatest impact?

A Watershed Approach



Stormwater Management Action Plan

Step 1: Receiving Waters Assessment (March 31, 2022)

Stormwater Influence Prioritization

Step 2: Prioritization Process (June 30, 2022)

Needs & Opportunities Prioritization



Stormwater Management Action Plan

Step 1: Receiving Waters Assessment (March 31, 2022)

Stormwater Influence Prioritization

Step 2: Prioritization Process (June 30, 2022)

Needs & Opportunities Prioritization

= Which receiving waters are most likely to benefit from stormwater management planning?

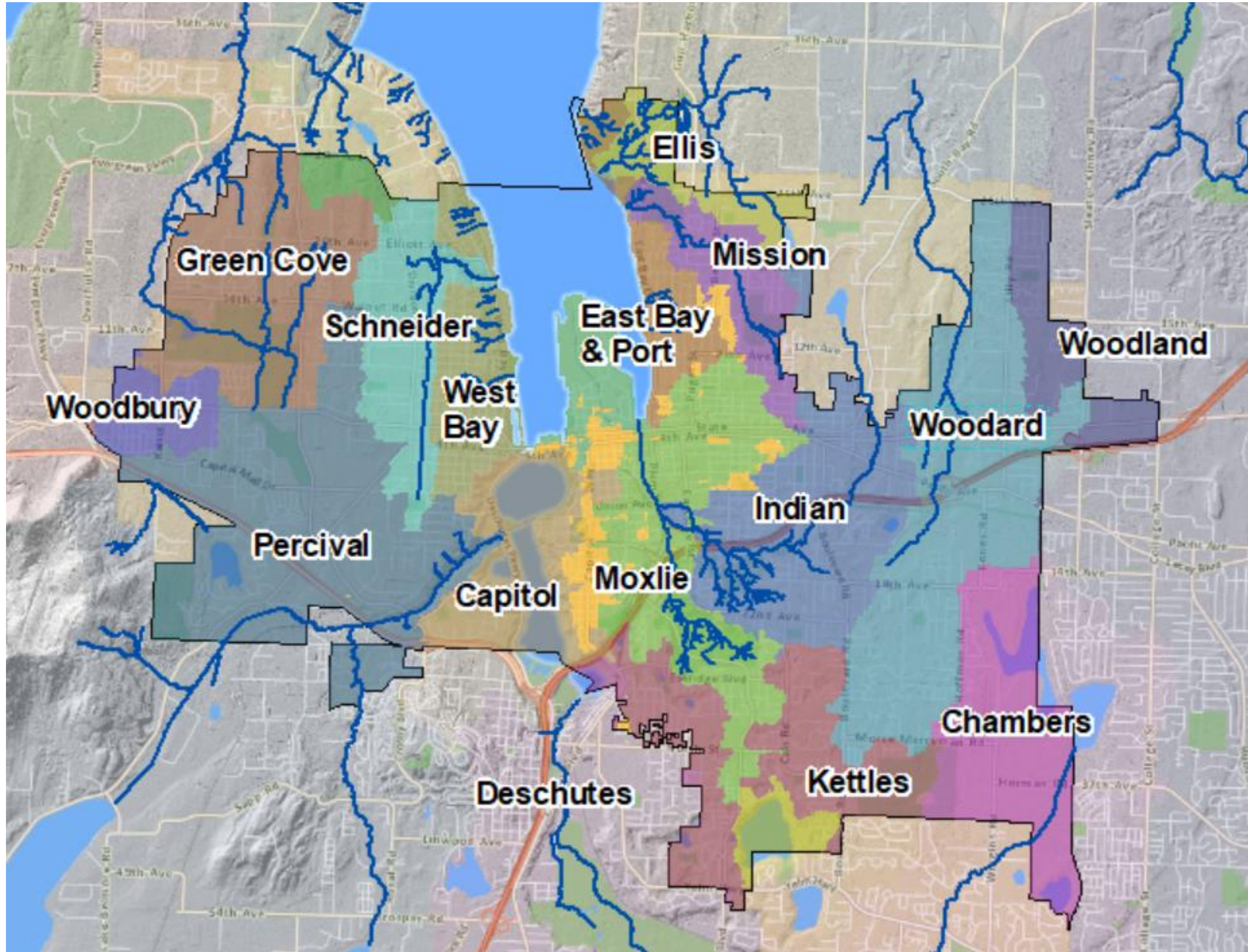
Step 3: Stormwater Mgmt Action Plan (March 31, 2023)

Develop plan for selected stream basin(s)



Stormwater Management Action Plan

Olympia's Stream Basins





Stormwater Management Action Plan

Basin Characterization

Basin	Total Basin Area	Subbasin Size (Acres within City)	% in Olympia	Impervious (Acres)	% Impervious	Pollution-Generating Impervious (Acres)	% UNTREATED Pollution-Generating Impervious (Acres)	Equity Index Level of Burden*	Receiving Waters	Drift (For direct discharge to Puget Sound)	Stormwater Mgmt Influence (High, Medium, Low)
Budd Inlet - East Bay & Peninsula	488	488	100%	256.00	52%	208.00	86%	Med	Budd Inlet	Left to Right	High
Budd Inlet - West Bay	1,540	484.8	31%	194.90	40%	130.00	83%	Med	Budd Inlet	No Appreciable Drift	High
Chambers	6,856	814.1	12%	68.70	8%	47.00	64%	Med	Deschutes > Capitol Lake > West Bay > Budd Inlet	N/A	Med
Deschutes	8,938	45.2	0.51%	9.90	22%	7.00	97%	High	Capitol Lake > West Bay > Budd Inlet	N/A	Low
Ellis	1,296	264	20%	28.10	11%	20.00	84%	Low	Budd Inlet	No Appreciable Drift (High Sediment)	Low
Green Cove	2,542	1031.3	41%	179	17%	113.00	51%	Low	Eld Inlet	Right to Left	Med
Indian	1,421	1089.1	77%	380.80	35%	268.00	67%	High	Moxlie Creek > East Bay > Budd Inlet	N/A	High
Kettles	1,355	868.4	64%	259.10	30%	158.00	59%	Med	Infiltration	N/A	N/A
Mission	408	383.6	94%	96.30	25%	56.93	79%	Low	Budd Inlet	Right to Left	High
Moxlie	1,006	1006.1	100%	446.10	44%	309.69	80%	High	East Bay > Budd Inlet	No Appreciable Drift	Med
Percival	10,290	1758.4	17%	791.30	45%	547.87	25%	Med	Capitol Lake > West Bay > Budd Inlet	No Appreciable Drift (High Sediment)	Med
Schneider	589	582	99%	210.60	36%	131.94	33%	Med	Budd Inlet	No Appreciable Drift	Med
Woodard	4,856	1496.3	31%	565.60	38%	376.00	40%	High	Henderson Inlet	No Appreciable Drift (High Sediment)	High
Woodland	19,466	347.2	2%	141.50	41%	97.00	42%	High	Henderson Inlet	No Appreciable Drift (High Sediment)	Low

* Level of Burden derived from Thurston Stormwater Equity Index (2022)



Stormwater Management Action Plan

Basin Characterization

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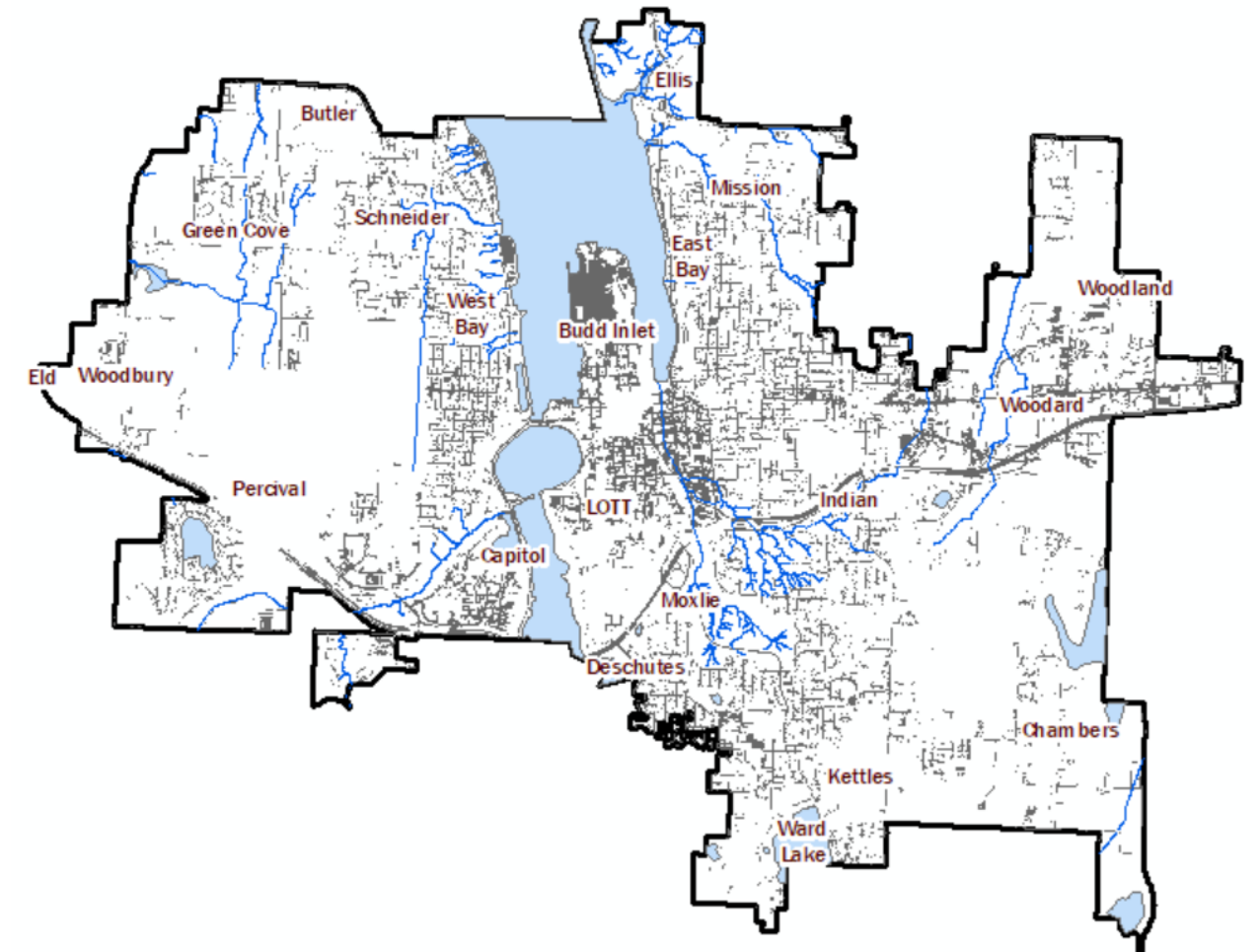
* Level of Burden derived from Thurston Stormwater Equity Index (2022)



Stormwater Management Action Plan

Stormwater Influence Prioritization

Basin Acres within City Limits	Total Impervious Surface	Total Impervious Surface (Raw Score)	Impervious Surface (Weighted Score)	Untreated Pollution- Generating Impervious Area	Untreated Pollution- Generating Impervious Area (Raw Score)	Untreated Pollution- Generating Impervious Area (Weighted Score)	
	% of basin covered by roads, sidewalks, driveways, parking lots, roof tops	Moderate impervious cover presents both stormwater challenges and opportunities for improvement, with implications on water quantity/flow	Weight 20%	% untreated impervious areas excluding rooftops and other surfaces that contribute little to no pollutant loads	Level of need for stormwater treatment; highest % presents greatest water quality challenges	Weight 20%	
Budd Inlet - East Bay & Peninsula	488	52%	1	0.2	86%	4	0.8
Budd Inlet - West Bay	591	40%	3	0.6	83%	4	0.8
Chambers	917	8%	2	0.4	64%	3	0.6
Deschutes	112	22%	3	0.6	97%	4	0.8
Ellis	272	11%	2	0.4	84%	4	0.8
Green Cove	1042	17%	2	0.4	51%	2	0.4
Indian	1001	35%	3	0.6	67%	3	0.6
Kettles	996	30%	3	0.6	59%	2	0.4
Mission	374	25%	3	0.6	79%	3	0.6
Moxlie	1541	44%	1	0.2	80%	3	0.6
Percival	1713	45%	1	0.2	25%	1	0.2
Schneider	635	36%	3	0.6	33%	1	0.2
Woodard	1733	38%	3	0.6	40%	1	0.2
Woodland	135	41%	1	0.2	42%	2	0.4
		> 40%	1 (High Cover)		20 - 40%	1	
		21 - 40%	3 (Moderate Cover)		41 - 60%	2	
		< 20%	2 (Low Cover)		61 - 80%	3	
					> 80%	4	



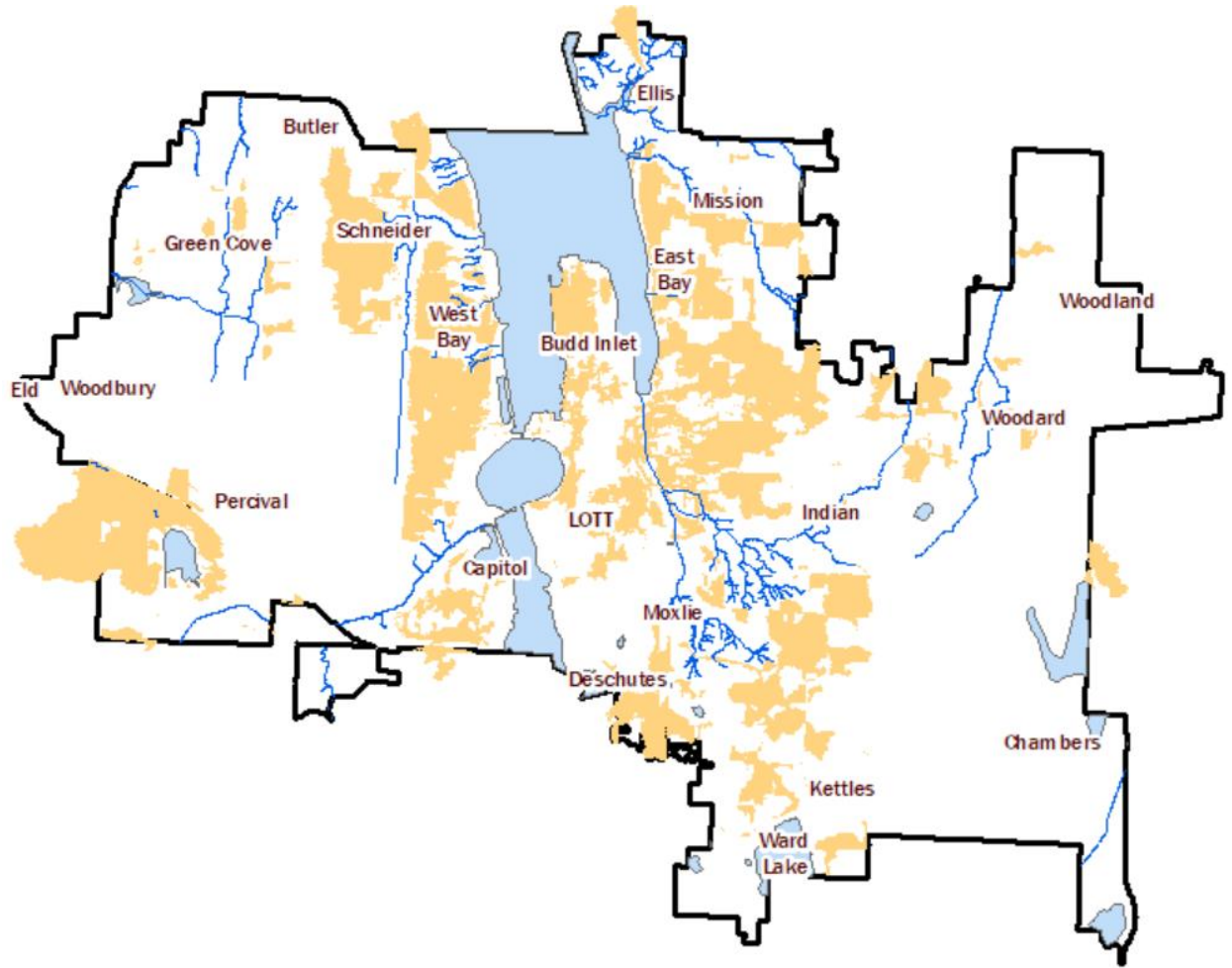
Untreated Pollution-generating
Impervious Area



Stormwater Management Action Plan

Stormwater Influence Prioritization

		MS4 Untreated Catchments	MS4 Untreated Catchments (Raw Score 1-4)	MS4 Untreated Catchments (Weighted Score)	TMDLs	TMDL (Raw Score)	TMDL (Weighted Score)
Basin Acres within City Limits		% of catchment areas to MS4 outfalls/receiving waters without treatment	Level of need for treatment to reduce pollutant loads into receiving waters	Weight 15%	Is mgmt action required by the City per current NPDES permit?	Yes = 1; No = 0	Weight 5%
Budd Inlet - East Bay & Peninsula	488	77%	5	0.75	No	0	0
Budd Inlet - West Bay	591	63%	5	0.75	No	0	0
Chambers	917	4%	1	0.15	Yes	1	0.05
Deschutes	112	0%	1	0.15	Yes	1	0.05
Ellis	272	3%	1	0.15	No	0	0
Green Cove	1042	9%	1	0.15	No	0	0
Indian	1001	29%	2	0.3	No	0	0
Kettles	996	30%	2	0.3	No	0	0
Mission	374	64%	5	0.75	No	0	0
Moxlie	1541	47%	4	0.6	No	0	0
Percival	1713	29%	2	0.3	Yes	1	0.05
Schneider	635	75%	5	0.75	No	0	0
Woodard	1733	33%	2	0.3	Yes	1	0.05
Woodland	135	0%	1	0.15	Yes	1	0.05
		< 20%	1 (Low)				
		21 - 33%	2 (Low-Med)				
		34 - 46%	3 (Med)				
		46 - 59%	4 (Med-High)				
		> 60 %	5 (High)				



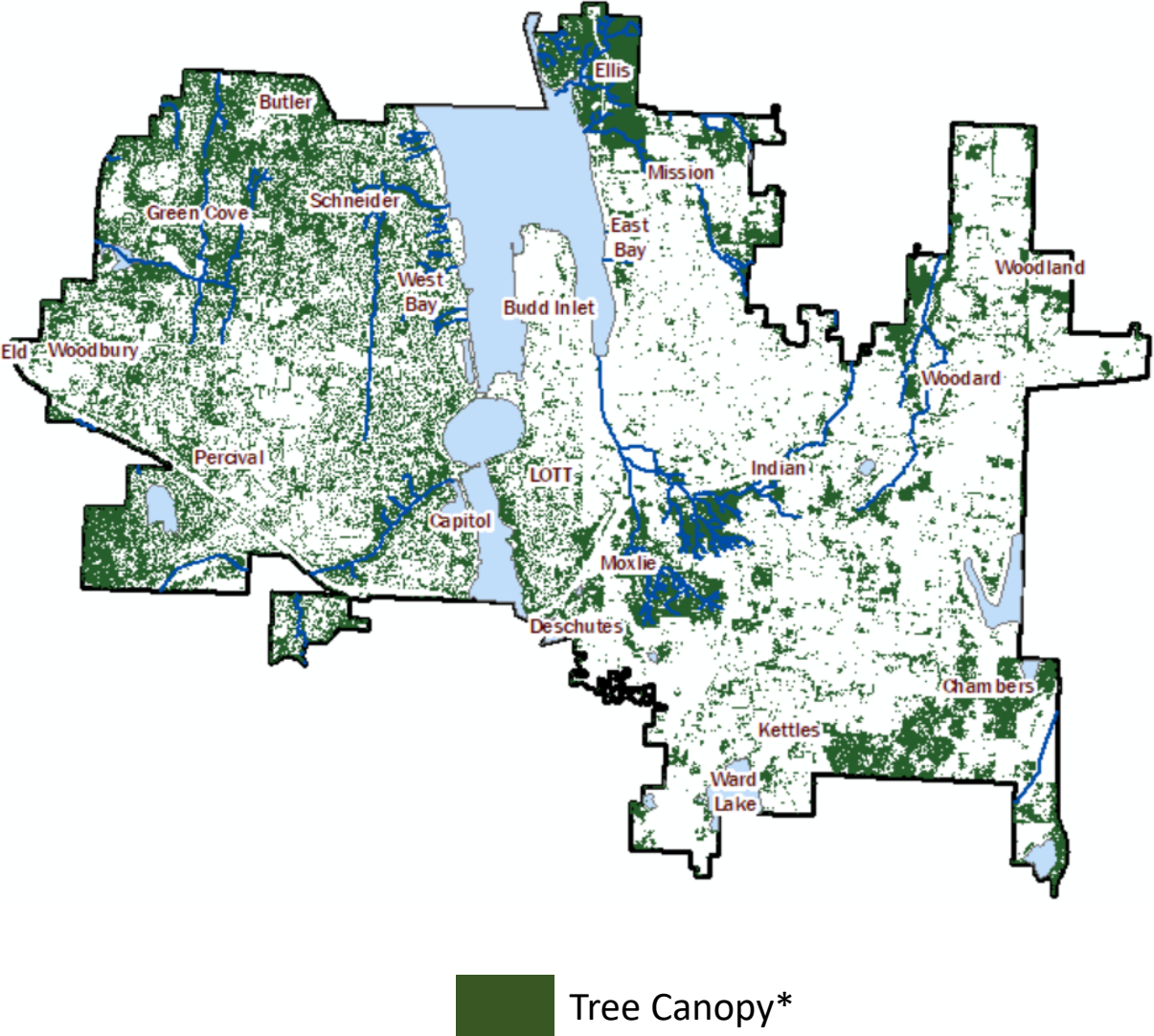
Untreated MS4 Catchment Areas



Stormwater Management Action Plan

Stormwater Influence Prioritization

		Intact Riparian Area	Intact Riparian Area (Raw Score)	Riparian Area (Weighted Score)	Tree Canopy*	Tree Canopy (Raw Score 0 -4)	Tree Canopy (Weighted Score) Weight
	Basin Acres within City Limits (Under 350 assumed low sw influence)	% of riparian natural areas buffer left undeveloped	Level of opportunity for aquatic habitat protection and/or restoration	Weight 15%	% cover; less tree cover associated w/higher stormwater flow and pollutant load	Level of need for tree planting and/or protection	Weight 5%
Budd Inlet - East Bay & Peninsula	488	75%	3	0.45	23%	4	0.2
Budd Inlet - West Bay	591	63%	2	0.3	41%	0	0
Chambers	917	55%	2	0.3	30%	2	0.1
Deschutes	112	66%	2	0.3	24%	4	0.2
Ellis	272	72%	3	0.45	60%	0	0
Green Cove	1042	86%	3	0.45	53%	0	0
Indian	1001	55%	1	0.15	21%	4	0.2
Kettles	996	N/A	0	0	21%	4	0.2
Mission	374	60%	2	0.3	32%	2	0.1
Moxlie	1541	49%	1	0.15	22%	4	0.2
Percival	1713	64%	2	0.3	38%	1	0.05
Schneider	635	52%	1	0.15	46%	0	0
Woodard	1733	72%	3	0.45	17%	4	0.2
Woodland	135	76%	3	0.45	19%	4	0.2
		< 55%	1 (Low)		< 25%	4 (High)	
		56 - 69%	2 (Med)		25 - 30 %	3 (Med-High)	
		> 70%	3 (High)		31 - 35 %	2 (Med)	
					36 - 40 %	1 (Low-Med)	
					> 40%	0 (Low)	



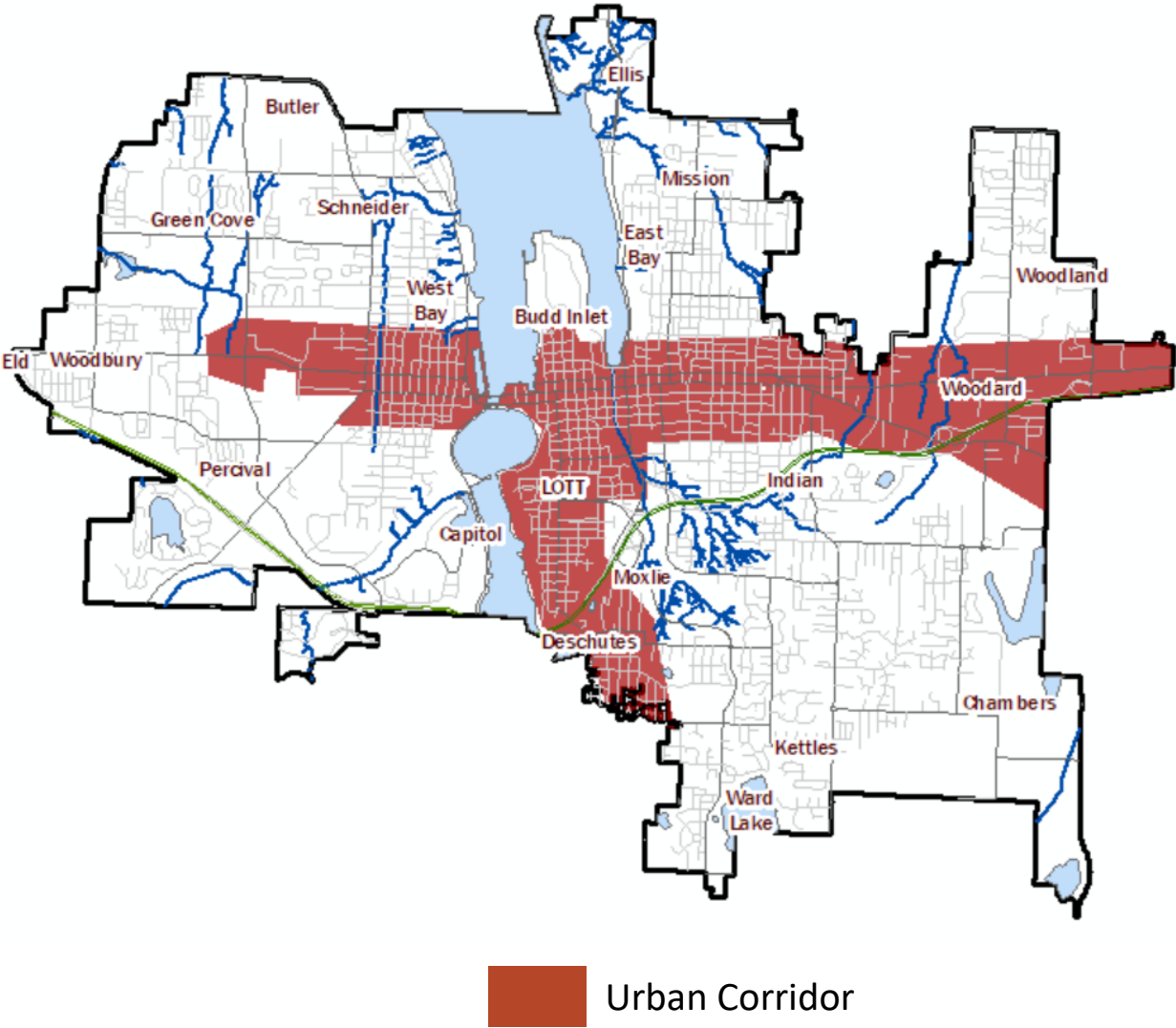
* Draft dataset to be updated 2022-2023



Stormwater Management Action Plan

Stormwater Influence Prioritization

	Basin Acres within City Limits (Under 350 assumed low sw influence)	Development Density	Development Density (Raw Score)	Development Density (Weighted Score)	Urban Corridor	Urban Corridor (Raw Score)	Urban Corridor (Weighted Score)
		Existing pressures based on current zoning	Level of mgmt need to offset impacts	Weight 10%	% of basin that falls within 1/2 mile of highest frequency transit routes, indicative of traffic- related pollutant loading and increasing development pressure	Level of mgmt need to offset traffic and urbanization impacts	Weight 10%
Budd Inlet - East Bay & Peninsula	488	Med	2	0.2	13%	1	0.1
Budd Inlet - West Bay	591	Med	2	0.2	32%	3	0.3
Chambers	917	Low	1	0.1	0%	0	0
Deschutes	112	Med	2	0.2	18%	2	0.2
Ellis	272	Low	1	0.1	0%	0	0
Green Cove	1042	Low	1	0.1	4%	1	0.1
Indian	1001	High	3	0.3	32%	3	0.3
Kettles	996	Med	2	0.2	N/A	N/A	N/A
Mission	374	Low	1	0.1	8%	1	0.1
Moxlie	1541	High	3	0.3	42%	3	0.3
Percival	1713	High	3	0.3	7%	1	0.1
Schneider	635	Med	2	0.2	23%	2	0.2
Woodard	1733	High	3	0.3	31%	3	0.3
Woodland	135	High	3	0.3	16%	2	0.2
					31 - 45%	3	
					16 - 30%	2	
					1 - 15%	1	
					0	0	





Stormwater Management Action Plan

Stormwater Influence Prioritization

Basin	Basin Acres within City Limits (Under 350 assumed low sw influence)	Weighted Score (Out of 34)	Stormwater Influence
Kettles*	996	N/A	N/A
Budd Inlet - West Bay	591	29.50	High
Budd Inlet - East Bay & Peninsula	488	27.00	High
Mission	374	25.50	High
Deschutes	112	25.00	Low
Indian	1001	24.50	High
Woodard	1733	24.00	High
Moxlie	1541	23.50	Med
Schneider	635	21.00	Med
Woodland	135	19.50	Low
Ellis	272	19.00	Low
Chambers	917	17.00	Med
Green Cove	1042	16.00	Med
Percival	1713	15.00	Med
* Kettles do not drain to receiving waters and were not included in assessment of stormwater influence			

Stormwater Influence Ranking Results



Stormwater Management Action Plan

Needs & Opportunities Prioritization

Tier 2 Basin Prioritization: Needs & Opportunities

	Pipe Condition	Flooding Hotspots	Future Land Use	B-IBI Score	Aquatic Wildlife	Equity Index	
	% of televised pipe rated 3 (3-digit code) or higher; Indicating maintenance priority	Total # 'Hotspots'	Projected 2045 impervious, riparian & forest cover conditions based on anticipated increased development	Benthic Index of Biotic Integrity Average Score 2018-2021	Habitat usage for salmonids, Olympia mudminnow, shellfish	Level of burden determined according to the Thurston Stormwater Equity Index	Weighted Scores (Draft)
Budd Inlet - East Bay & Peninsula	66%	10	Impacted	N//A	Low	Med	0.95
Budd Inlet - West Bay	59%	7	Impacted	N//A	Low	Med	0.90
Chambers	53%	1	Degraded	N//A	Med	Med	0.80
Deschutes	14%	1	Impacted	N//A	High	High	1.10
Ellis	80%	0	Impacted	Good	High	Low	0.95
Green Cove	47%	4	Impacted	Good	High	Low	0.75
Indian	58%	13	Very Degraded	Poor	Low	High	1.60
Kettles	50%	11	Degraded	N//A	Low	Med	0.70
Mission	59%	0	Degraded	Good	High	Low	0.85
Moxlie	61%	8	Very Degraded	Poor	Low	High	1.45
Percival	71%	23	Very Degraded	Fair	High	Med	1.65
Schneider	55%	16	Degraded	Fair	Med	Med	1.40
Woodard	50%	8	Impacted	Good	High	High	1.30
Woodland	45%	1	Degraded	Fair	Med	High	1.45



Stormwater Management Action Plan

Basin Prioritization Criteria

Stormwater Influence Prioritization

- % Impervious Surface
- % Untreated Stormwater to Waterbodies
- % Within Urban Corridor
- Water Quality Conditions
- Condition of Stormwater Pipes
- Development Density
- Existing Intact Natural Infrastructure (wetlands, stream banks, tree cover)

Needs & Opportunities Prioritization

- Condition of Stormwater Pipes
- Known Flooding “Hot Spots”
- Future Land Use & Re-development
- Level of burden/vulnerability per Thurston Equity Index
- Aquatic Wildlife Uses
- *Other considerations basin-by-basin*



Stormwater Management Action Plan

Basin Prioritization

Preliminary Results



Stormwater Management Action Plan

Stormwater Influence & Basin Prioritization Preliminary Results

Basin	Acres (Under 350 assumed low sw influence)	Stormwater Influence	Stormwater Management Needs & Opportunities Prioritization	
			Score	Ranking
Percival	1713	Medium	1.65	1
Indian	1001	High	1.6	2
Woodland	135	Low	1.45	3
Moxlie	1541	Medium	1.45	4
Schneider	635	Medium	1.4	5
Woodard	1733	High	1.3	6
Deschutes	112	Low	1.1	7
Ellis	272	Low	0.95	8
Budd Inlet - East Bay & Peninsula	488	High	0.95	9
Budd Inlet - West Bay	591	High	0.9	10
Mission	374	High	0.85	11
Chambers	917	Medium	0.8	12
Green Cove	1042	Medium	0.75	13
Kettles*	996	N/A	0.7	14
* Kettles do not drain to receiving waters and were not included in assessment of stormwater influence				

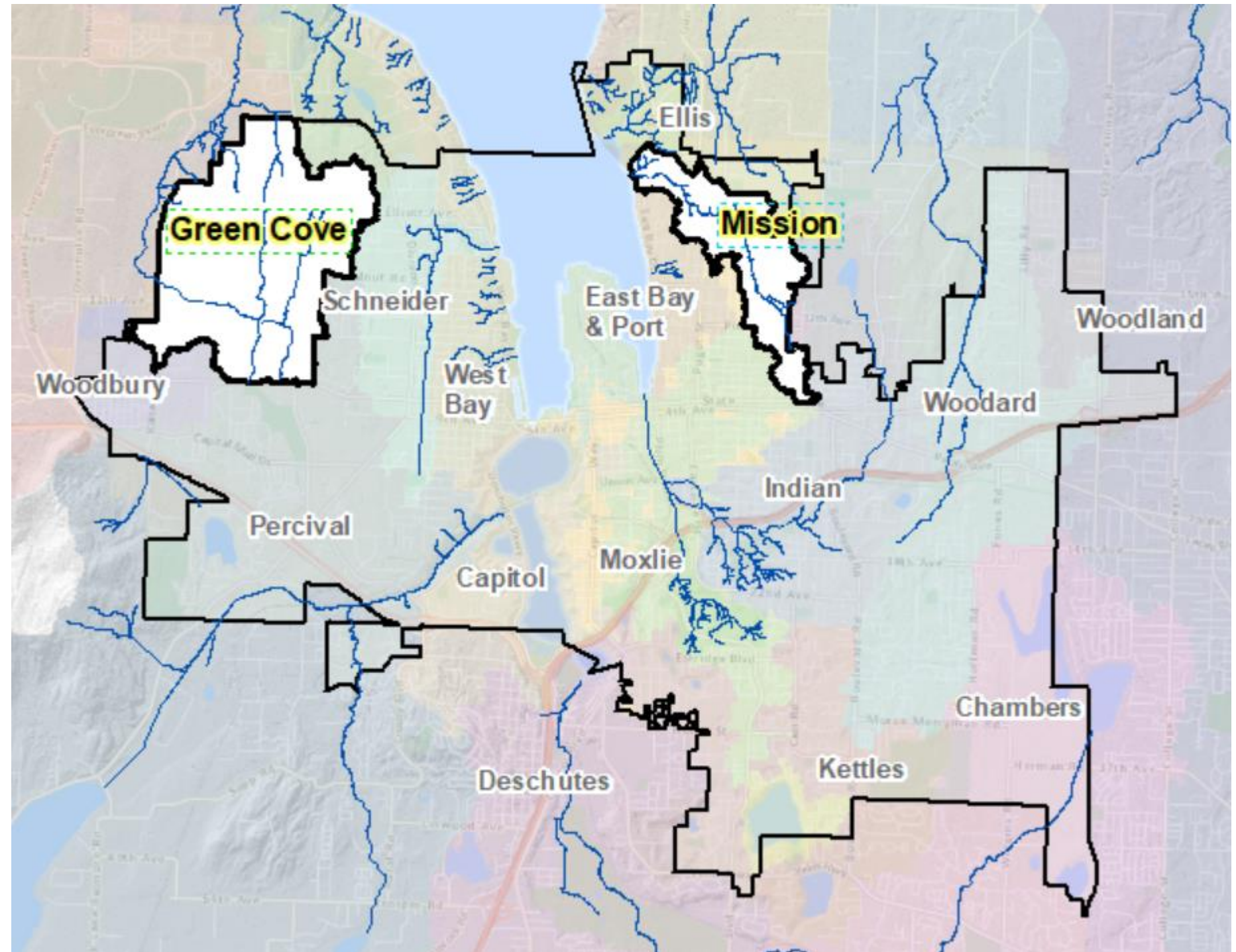


Stormwater Management Action Plan

Basin Prioritization

Green Cove & Mission

- Existing natural infrastructure & conservation
- Less development pressure
- Less pollution-generating impervious surfaces
- Low Equity Index priority level



Lower Need / Lower Opportunities

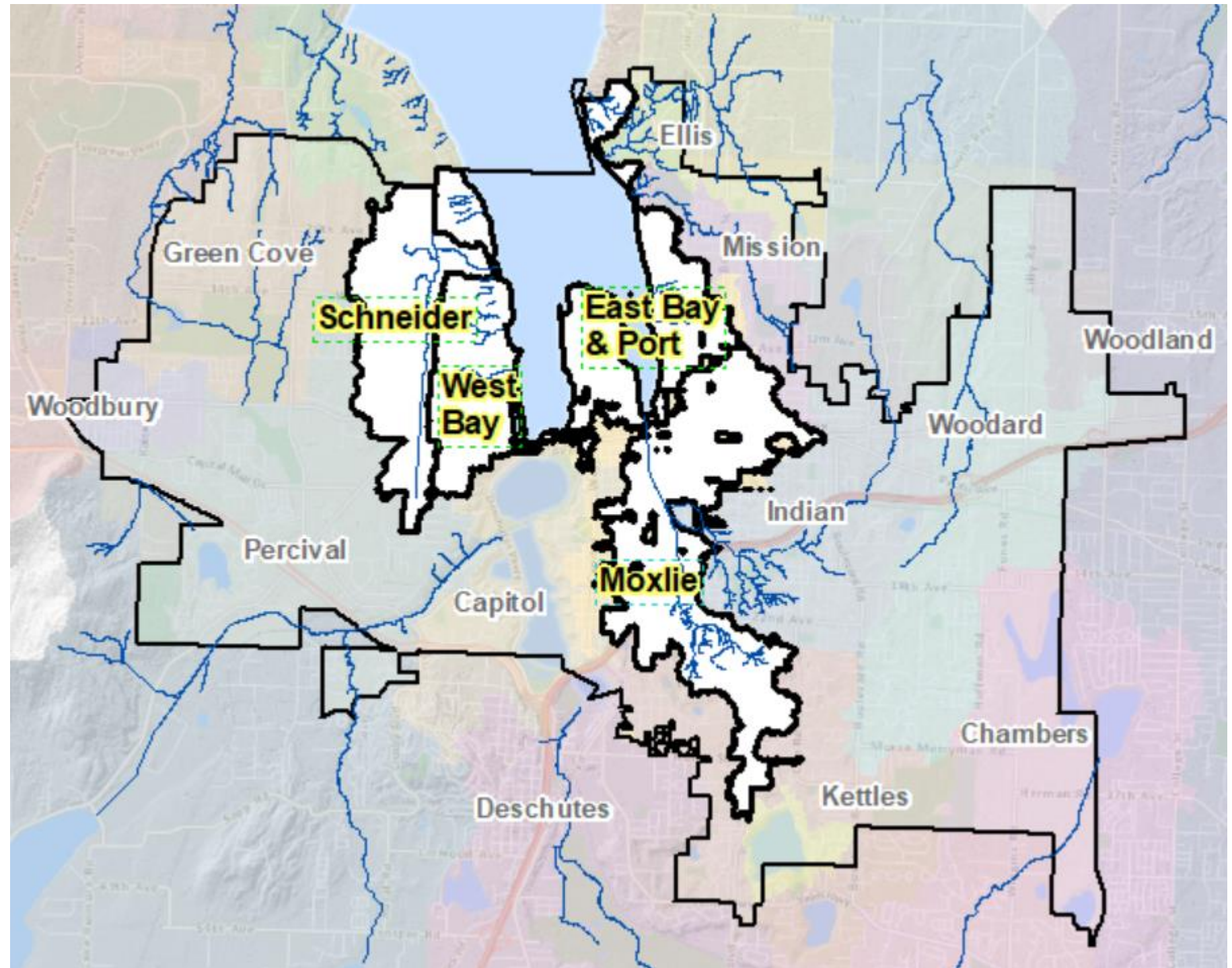


Stormwater Management Action Plan

Basin Prioritization

East & West Bay, Schneider, Moxlie

- Older neighborhoods, moderately to heavily developed
 - Heavily impacted
- Mixed/limited remaining natural infrastructure
- Mixed Equity Index level



Higher Need / Lower Opportunities

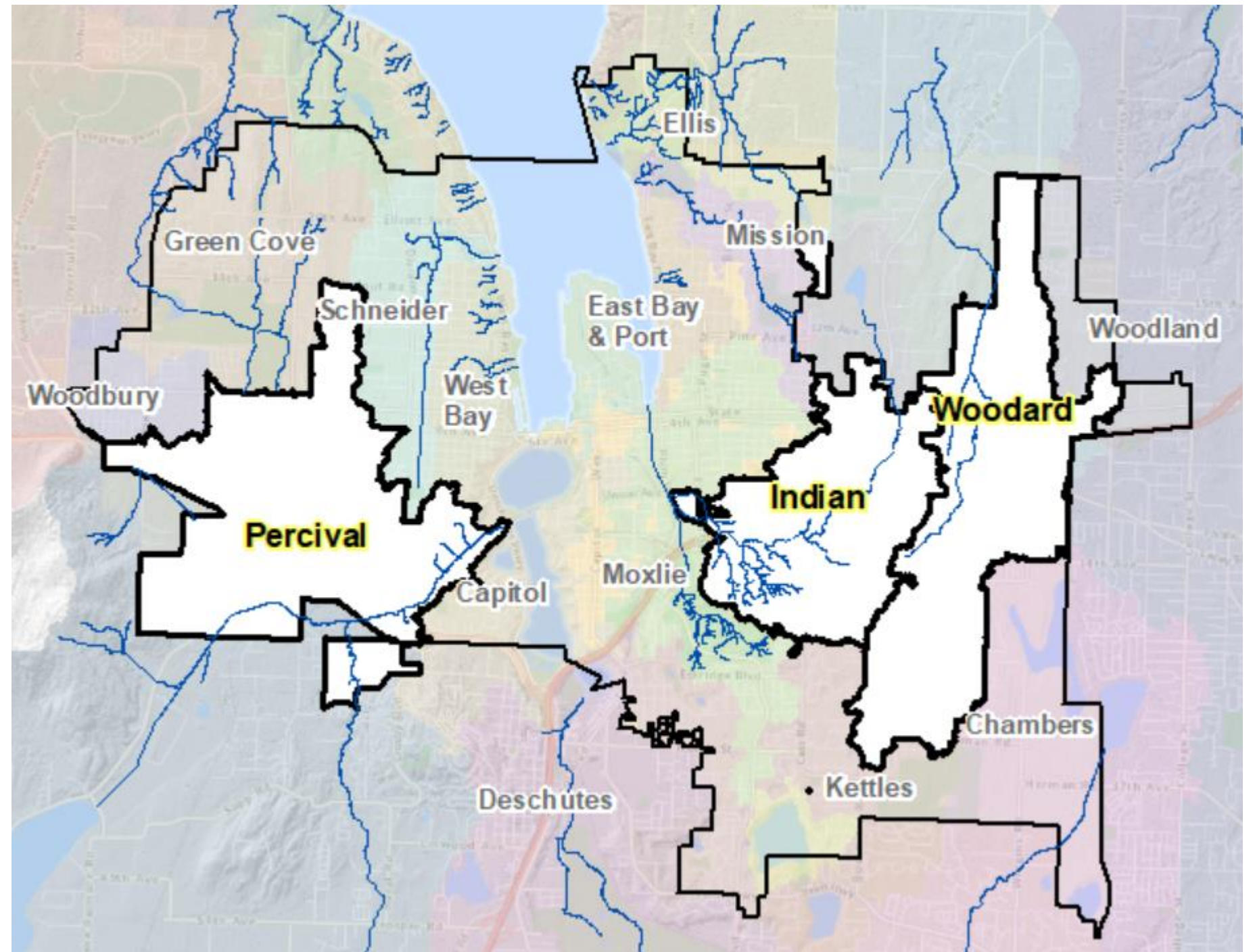


Stormwater Management Action Plan

Basin Prioritization

Percival, Indian, Woodard

- Anticipating re-development
 - Existing habitat for conservation & restoration
 - Substantial impervious surface & WQ implications
- Med-High Equity Index level
 - Integrates w/other jurisdictions' SMAP



Higher Need / Higher Opportunities



Stormwater Management Action Plan

Notes & Take-aways

- *“Don’t overthink it”*
- *Ongoing infrastructure discovery & assessment needed
(and in progress)*
- *Continue coordination w/neighboring agencies &
community stakeholders*



Stormwater Management Action Plan

Next Steps

- *Include additional stakeholders in criteria prioritization*
 - *Synthesize and re-assess prioritization results*
 - *Select highest priority basin(s)*



Stormwater Management Action Plan

Stormwater Mgmt Needs Citywide (Preliminary Gap Analysis)

- *More robust water quality monitoring*
 - *Sediment control and testing*
- *Ongoing MS4 catchment mapping QA/QC*
 - *Existing treatment QA/QC*
- *Green Stormwater Infrastructure feasibility research*
 - *Land Acquisition Plan*



Stormwater Management Action Plan

Thank you!

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Photo: Green Infrastructure Foundation