Developing the LA River Watershed Bacteria TMDL Dry Weather Implementation Schedule

CREST Steering Committee/WT Group

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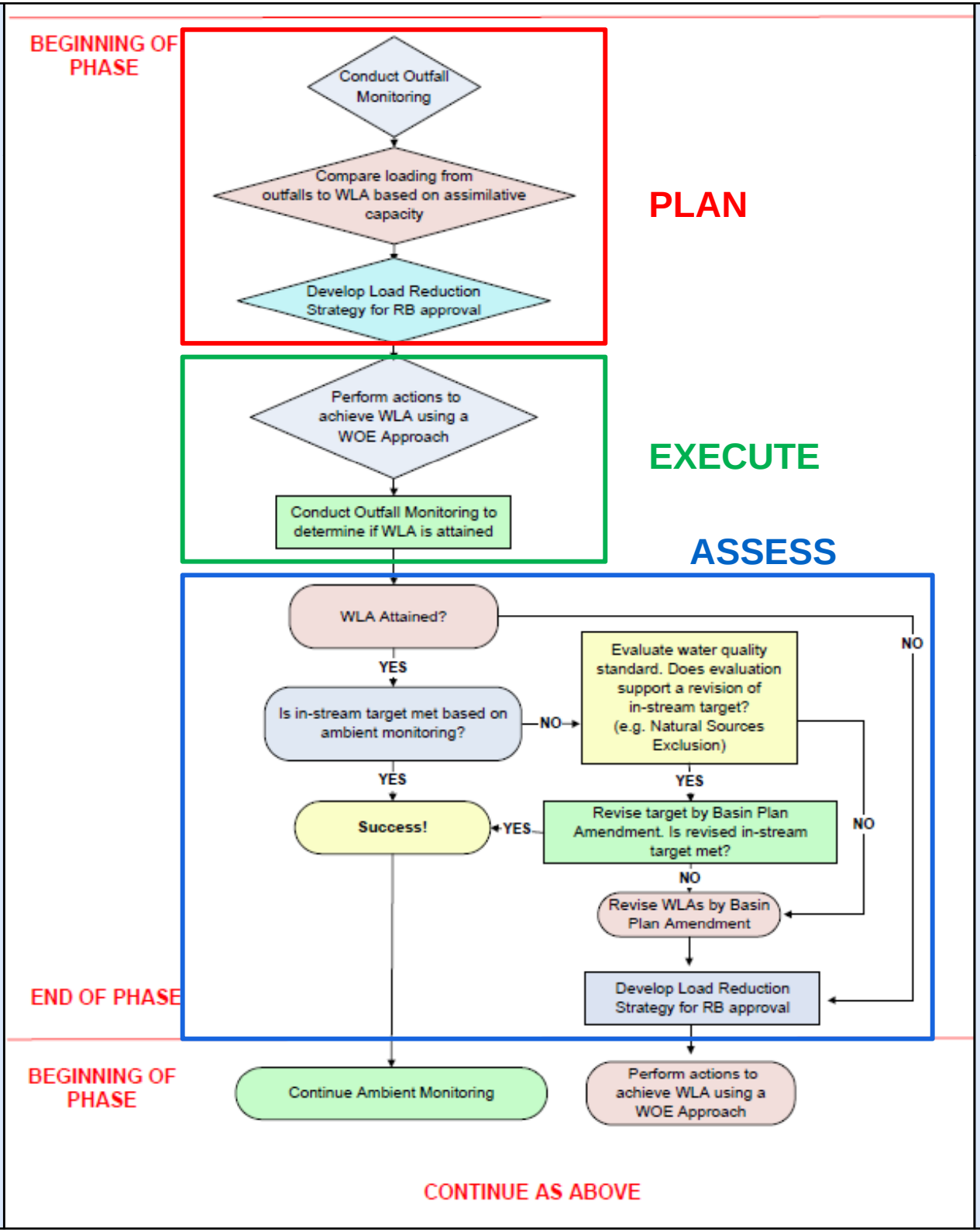
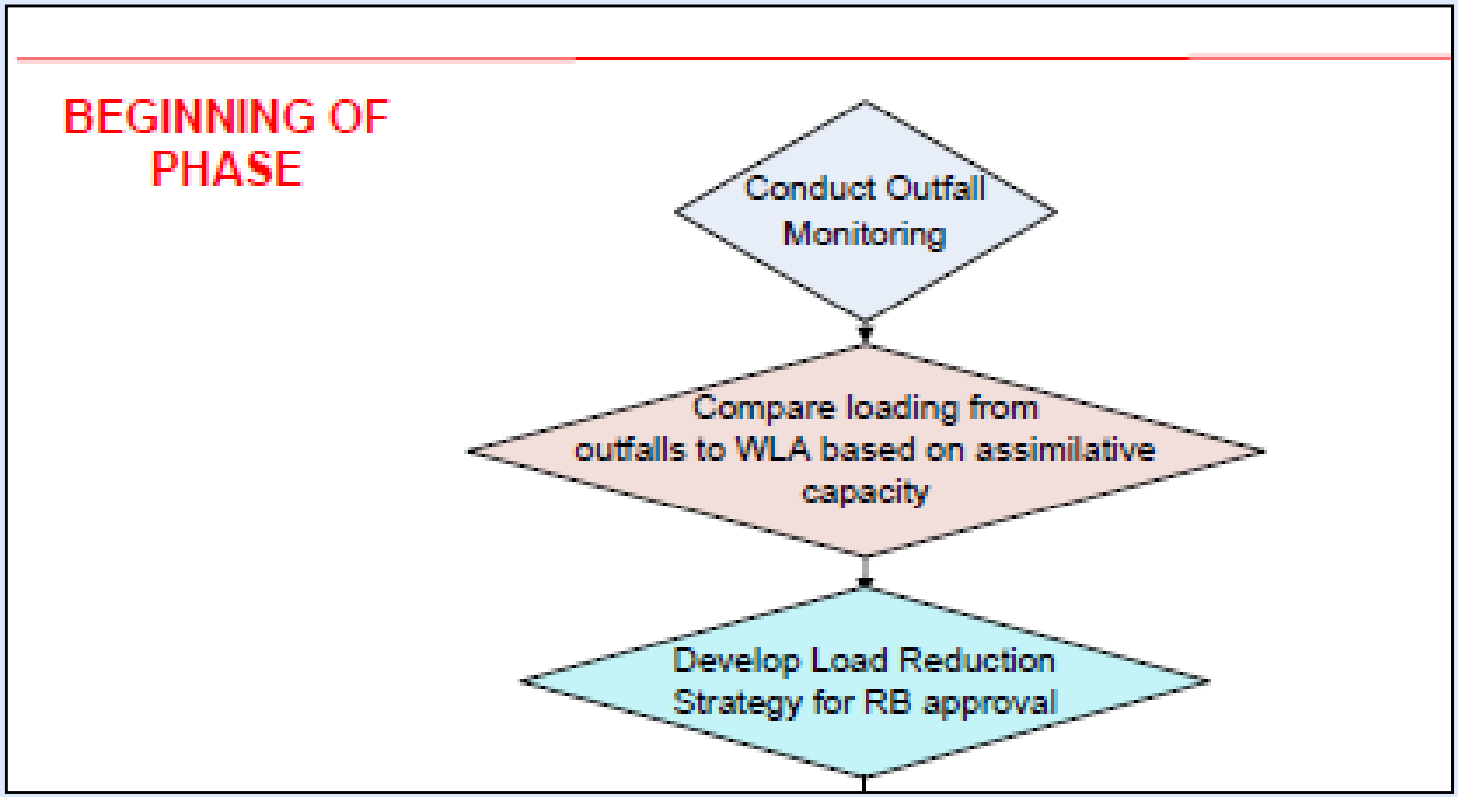
Overview

- Implementation framework includes:
  - The steps taken to plan a load reduction strategy for any phase or reach
  - The execution of the strategy for the phase or reach
  - Assessment of the effectiveness and identification and execution of follow-up actions as necessary, and reconsider TMDL (i.e., TMDL reopener)
- Overall implementation schedule is being developed on this framework
  - These are the three “building blocks”



Each “building block” needs to be considered in developing schedule

Building Block #1: Plan



STEP #1:

Create model (Monte Carlo) of storm drain discharges along LA River reach based on outfall monitoring data.

Outfall	Estimated *E. coli* Loading Rate (10^9 MPN/day)
RX-1	18
RX-2	298
RX-3	24
RX-4	123
.	.
.	.
.	.
RX-35	6

Note: Order is from upstream to downstream. RX-1, RX-2, etc. are hypothetical site names.

STEP #2:

Rank outfalls from highest to lowest based on simulated *E. coli* percent reduction and categorize using WOE Approach.

Outfall	Estimated *E. coli* Loading Rate (10^9 MPN/day)	Estimated *E. coli* Loading Percent Reduction if Outfall Removed	Problematic for WOE Indicators other than *E. coli*?
RX-17	385	22%	YES √
RX-2	298	17%	YES √
RX-31	245	14%	YES √
RX-14	210	12%	NO
RX-9	158	9%	YES √
RX-24	140	8%	NO
RX-32	105	6%	YES √
.		.	.
.		.	.
.		.	.
.		.	.
RX-7	18	1%	NO

Note: Order is from highest to lowest % reduction. Only WOE outfalls have a check-mark. WOE indicators other than *E. coli* could include human *Bacteroidales*, human pathogens, *Enterococcus*, and/or other alternative indicators.

Option: For cost savings, agencies may elect to emphasize only *E. coli* for implementation actions (as opposed to relying upon the WOE Approach).

STEP #3:

Determine the number of WOE outfalls required to reduce total storm loading to below WLA (based on Monte Carlo simulation median).

Outfall	Estimated *E. coli* Loading Percent Reduction if Outfall Removed	Total Storm Drain Loading once Removed (Cumulative) based on Simulation Median (10^9 MPN/day)
RX-17	22%	1365
RX-2	17%	1070
RX-31	14%	820
RX-9	9%	670
RX-18	7%	540
RX-32	6%	440
RX-28	6%	330
RX-11	5%	250
RX-19	4%	180
.	.	.
.	.	.
.	.	.
RX-7	1%	325

Note: Order is from highest to lowest % reduction (only WOE outfalls). "Cutoff "is drawn at hypothetical WLA of 400 x 10^9 MPN/day. Only outfalls above the WLA cutoff are check-marked.

STEP #4:

Perform implementation actions on WOE outfalls that fell above the WLA "cutoff".

Minimum Outfalls Subject to Implementation Actions
RX-17 √
RX-2 √
RX-31 √
RX-9 √
RX-18 √
RX-32 √
RX-28 √

Note: Only WOE outfalls above the WLA cutoff are targeted for implementation actions.

Option: Instead of completely "removing" a discharge from an outfall (e.g., diversion), agencies may elect to utilize BMPs that reduce a significant portion of the *E. coli* loading from the outfall (e.g., a wetland that achieves a 70% reduction). In this case, additional outfalls (i.e. outfalls below the "cutoff") would likely need to be addressed within the phase. The model (Monte Carlo) could be used to estimate the combination of outfalls and BMPs needed to meet the WLA.

Recap
Identify Priority Outfalls for Phase

Example Priority Outfalls

Reach X Priority Outfalls[1,2]	Permittees in Drainage Area	Reach X Priority Outfalls[1,2]	Permittees in Drainage Area
RX-17	Agency A	RX-9	Agency E Agency F Agency G
RX-2	Agency B Agency C Agency D Agency E Agency F	RX-4	Agency M Agency N
		RX-32	Agency A
RX-31	Agency A Agency D	RX-28	Agency Q

[1] Theoretically, based on outfall monitoring and Monte Carlo analysis, removal of discharges from these outfalls will result in attainment of the WLA for Reach X.

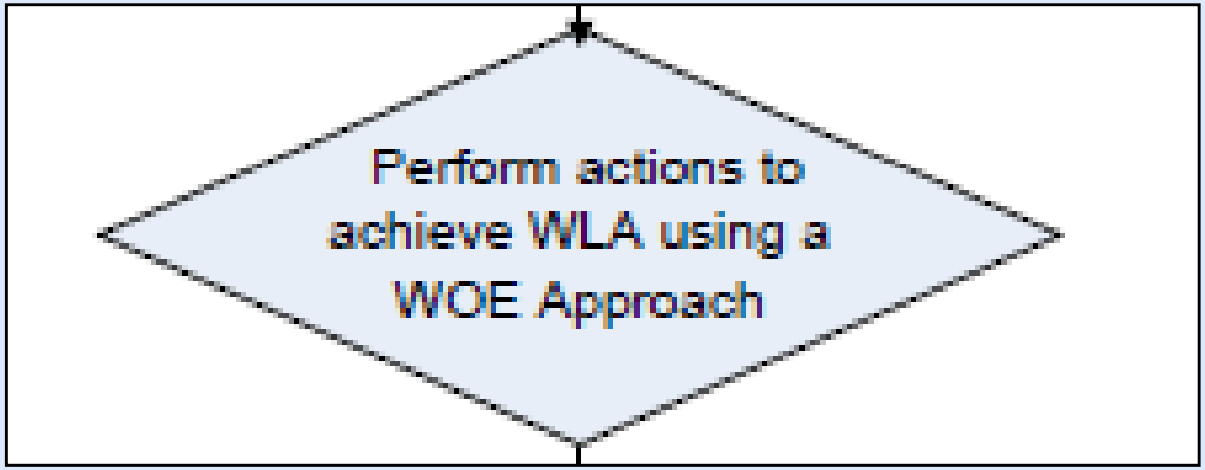
[2] If BMPs are utilized that provide less than 100% removal, additional outfalls (from Step 3 in Implementation Prioritization) will likely need to be added to this list to meet the WLA for Reach X.

Recap -
Develop Time Line for Implementation Steps

Example Implementation Steps

	Plan	Submit for Approval/Acceptance	Execute
Actions	▪ Initiate investigations of project feasibility for reach X outfalls ▪ Coordinate among agencies ▪ Develop reach-specific Strategic Plan with details of the outfall actions in the Phase	▪ Submit Reach-specific Strategic Plan with Details of Proposed Outfall Actions for RWQCB approval including: - Approach to each individual priority outfall. - Demonstrationwith model (Monte Carlo) the expected reduction in loading based on proposed actions at - Demonstration with model (Monte Carlo) that expected loading from all outfalls after actions are taken will meet the WLA.	▪ Complete design and construction and begin operation of diversion or structural BMPs and / or ▪ Implement non-structural / source control BMPs and / or ▪ Complete SSO elimination project and / or ▪ Complete actions to eliminate OTWS Source (s)
Time Frame	▪ --- months after the effective date of TMDL	▪ --- months after submittal of Reach-Specific Plan	▪ By the end of the Phase (----Years)

Building Block #2: Execute



Considerations for “Execute”

1. Forecast potential overall number of outfalls/subwatersheds that may need action to meet WLA reductions
2. Develop realistic estimate for accomplishing typical projects/actions
3. Develop overall schedule based on these factors plus reach priorities and jurisdictional considerations

- Focus today on Step #1 and Step #2

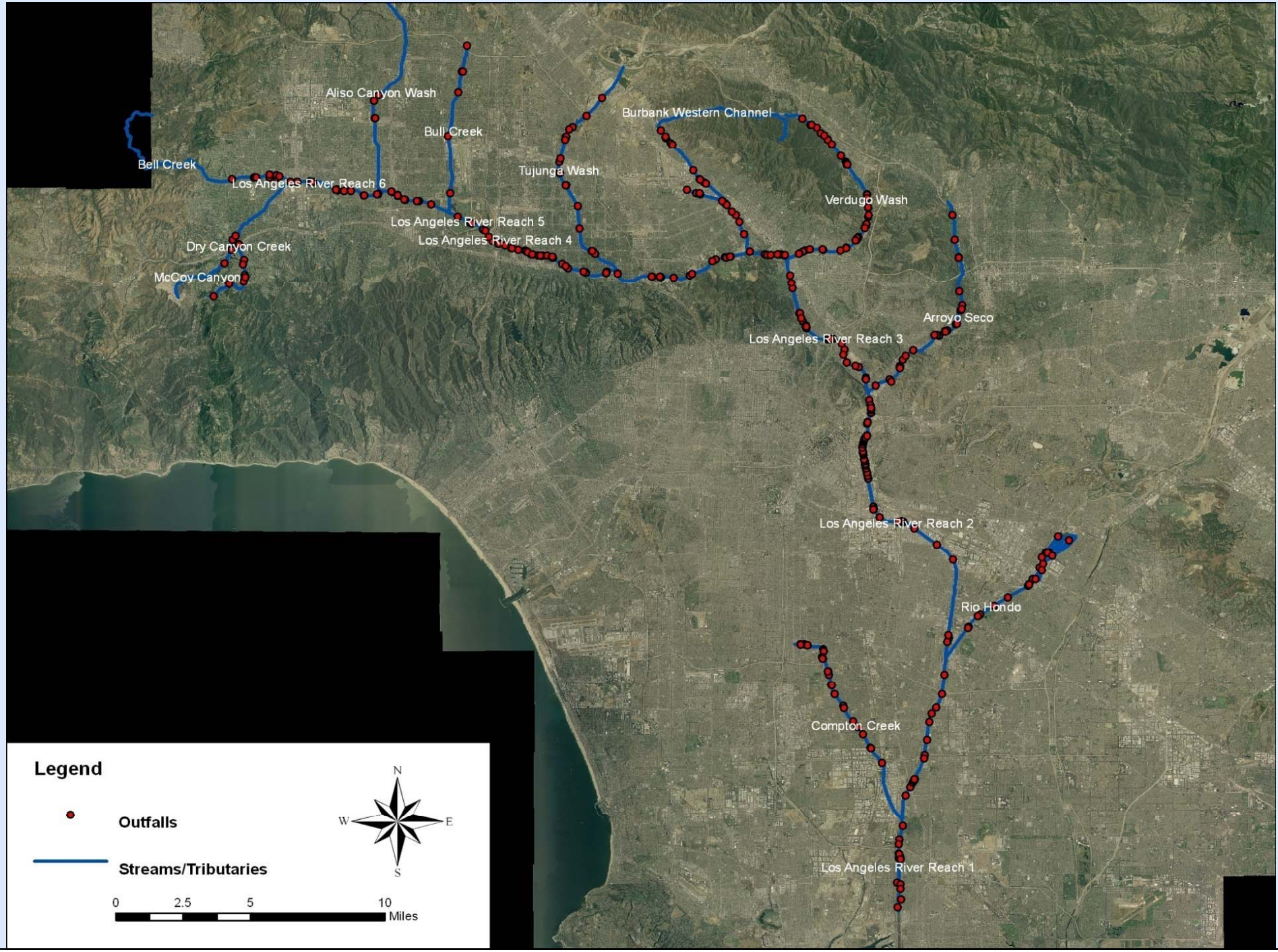
Step #1: Forecast Potential Number of Drains/Subwatersheds

- Conduct GIS/drainage system analysis
- Estimate total number of outfalls by reach and tributary
- Identify potential number of that may require actions based on preliminary application of R2 and R4 BSI Monitoring and Monte Carlo analysis results

Drainage System Analysis

- For the effort to develop a potential schedule:
  - Inventory includes all LAR reaches, and all tributaries on current or proposed 303(d) list
  - Inventory does not count drains that appear to be local culverts or have negligible drainage area

Preliminary Identification of Outfalls



Preliminary Identification of Outfalls

Reach/ Tributary	303(d) Listed	Length (mi)	Total # Outfalls
Los Angeles River Reach 1 (Estuary to Carson Street)	x	5.2	13
Compton Creek	x	8.5	26
Los Angeles River Reach 2 (Carson to Figueroa Street)	x	18.8	69
Arroyo Seco Reach 1 (LA River to West Holly Ave.)	x	5.2	23
Arroyo Seco Reach 2 (Figueroa St. to Riverside Dr.)	x	4.4	8
Rio Hondo Reach 1 (Confl. LA River to Santa Ana Fwy)	x	4.6	13
Rio Hondo Reach 2 (At Spreading Grounds)	x	9.3	12
Los Angeles River Reach 3 (Figueroa St. to Riverside Dr.)		7.9	33
Burbank Western Channel	x	14.4	27
Verdugo Wash Reach 1 (LA River to Verdugo Rd.)	x	2.0	7
Verdugo Wash Reach 2 (Above Verdugo Road)	x	7.5	36
Los Angeles River Reach 4 (Riverside Dr. to Sepulveda Dam)	x	11.1	63
Tujunga Wash (LA River to Hansen Dam)	x	9.7	25
Los Angeles River Reach 5 (within Sepulveda Basin)		1.9	6
Bull Creek	x	6.6	6
Los Angeles River Reach 6 (Above Sepulveda Flood Control Basin)	x	7.0	41
Aliso Canyon Wash	x	10.1	5
Bell Creek	x	8.9	11
Dry Canyon Creek	x	3.9	11
McCoy Canyon Creek	x	4.0	5
Total		**151.0**	**440**

Identifying Number of Outfalls Requiring “Action”

- Based on a preliminary WLA Calculation and Monte Carlo Analysis for BSI monitoring data for both Reaches 2 and 4, estimated that elimination of bacteria load from the highest priority outfalls to meet WLA for MS4s
- Priority outfalls have high total bacteria loading and/or high human source signal

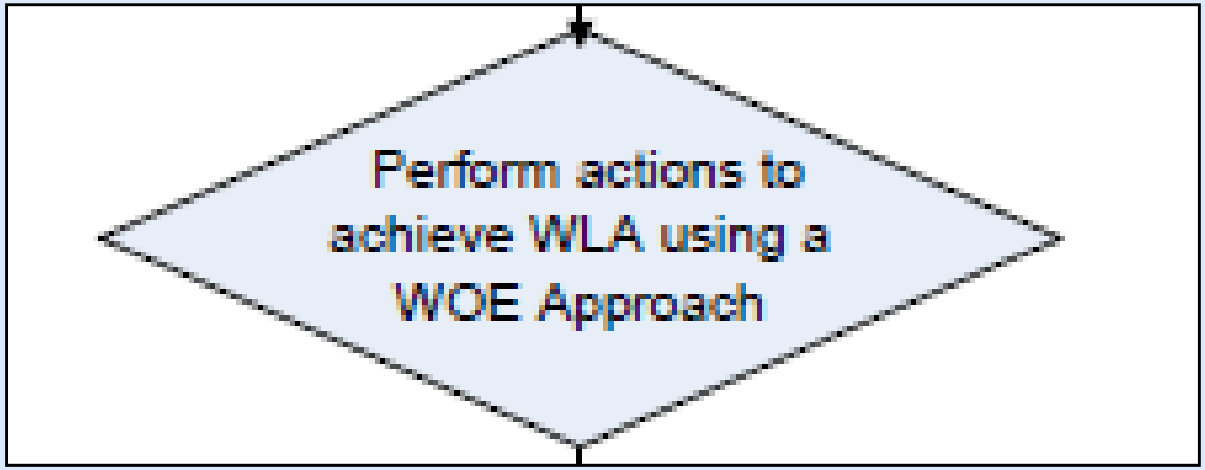
Identifying Number of Outfalls/Watersheds

- Based on analysis, used 15% target to develop estimate of total number of outfalls requiring initial action for each by reach and tributary
- There may be additional outfalls (assume 50% of initial number) that may need addressing through follow-up actions if post-implementation monitoring indicates WLA not met with initial actions

Preliminary Projection of Outfalls/Subwatersheds Requiring Action

Reach/ Tributary	Length (mi)	Total # Outfalls	Install Initial Low Flow Diversions (LFDs) or other BMPs	Install Potential Follow-up LFDs or other BMPs
Los Angeles River Reach 1 (Estuary to Carson Street)	5.2	13	2	1
Compton Creek	8.5	26	4	2
Los Angeles River Reach 2 (Carson to Figueroa Street)	18.8	69	10	5
Arroyo Seco Reach 1 (LA River to West Holly Ave.)	5.2	23	3	1
Arroyo Seco Reach 2 (Figueroa St. to Riverside Dr.)	4.4	8	1	1
Rio Hondo Reach 1 (Confl. LA River to Santa Ana Fwy)	4.6	13	2	1
Rio Hondo Reach 2 (At Spreading Grounds)	9.3	12	2	1
Los Angeles River Reach 3 (Figueroa St. to Riverside Dr.)	7.9	33	5	2
Burbank Western Channel	14.4	27	4	2
Verdugo Wash Reach 1 (LA River to Verdugo Rd.)	2.0	7	1	
Verdugo Wash Reach 2 (Above Verdugo Road)	7.5	36	5	2
Los Angeles River Reach 4 (Riverside Dr. to Sepulveda Dam)	11.1	63	9	4
Tujunga Wash (LA River to Hansen Dam)	9.7	25	4	2
Los Angeles River Reach 5 (within Sepulveda Basin)	1.9	6	1	1
Bull Creek	6.6	6	1	
Los Angeles River Reach 6 (Above Sepulveda Flood Control Basin)	7.0	41	6	3
Aliso Canyon Wash	10.1	5	1	
Bell Creek	8.9	11	2	1
Dry Canyon Creek	3.9	11	2	1
McCoy Canyon Creek	4.0	5	1	
Calabasas Creek (Downstream of McCoy Canyon and Dry Canyon)	2.9	3	0	
Total	**157.4**	**446**	**67**	**30**

Building Block #2: Execute



STEP 2: What Actions Does it Take and How Long to Take all Actions

Typical Time Line For Outfall Actions

- Developing typical time line for outfall actions
  - Low flow diversions
  - Other watershed BMP approaches

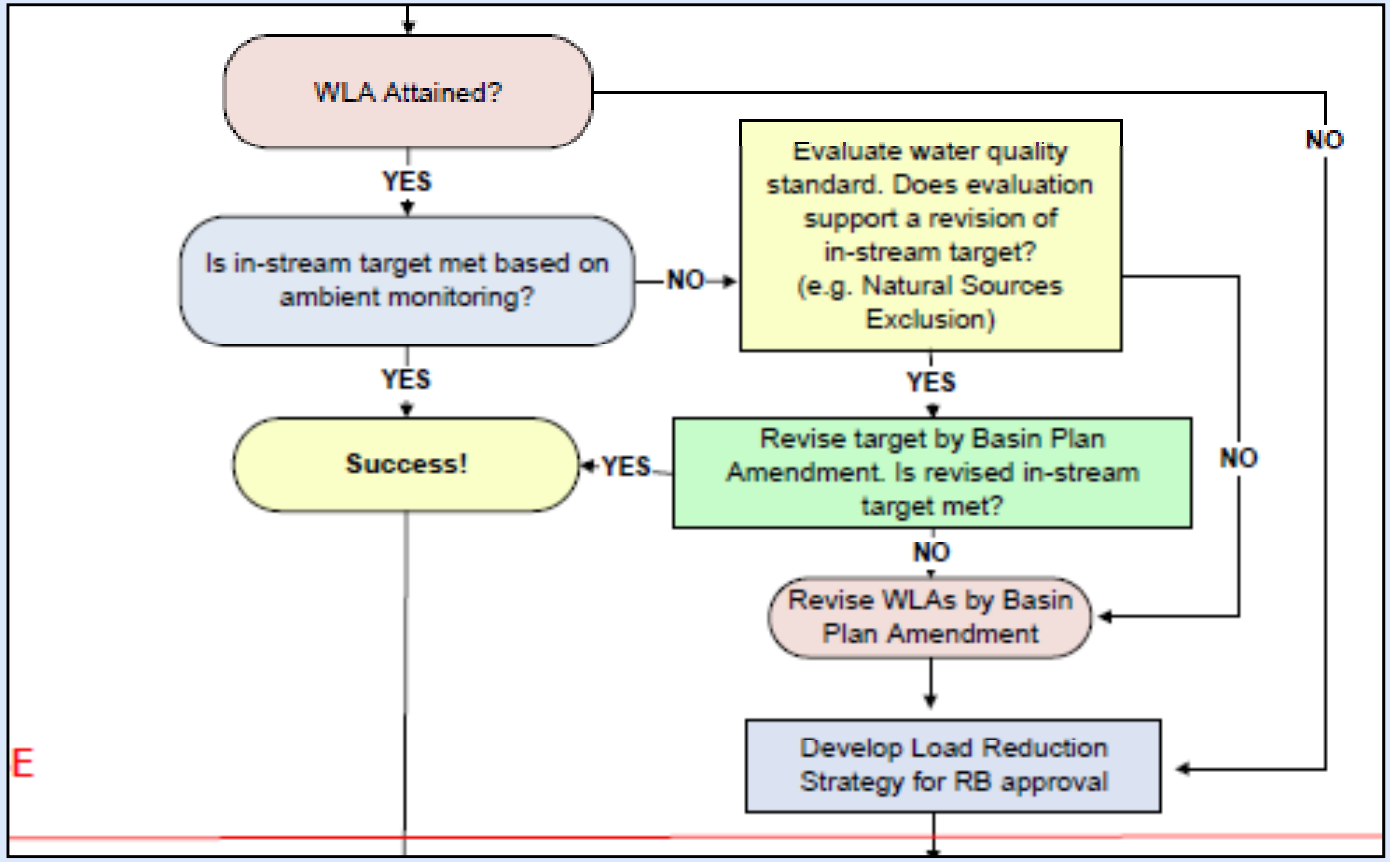
Components that Affect Time Line for Typical LFD Project

- Planning (for LFD includes ID sewer system connection/capacity, LFD location, etc)
- Permits/agreements
- Pre-design
- Design
- Advertise/Bid/Award
- Construction
- Post-construction and turnover to maintenance

Components that Affect Time Line for Other Actions

- Examples
  - LID measures (new/retrofit)
  - Distributed or sub regional multi-use projects
  - Source reduction/elimination including SSOs
- Steps vary depending upon strategy (e.g.)
  - Investigation
  - Planning, permitting, land acquisition, interagency agreements
  - Design, construction, other implementation actions

Building Block #3: Assess



Considerations for “Assess”

1. Compare loading to WLA
   - If WLA is met, evaluate target.
   - If WLA not met, develop new Load Reduction Strategy (if target is not met).
2. Analyze results and implications of special studies
3. TMDL Re-openers
4. Basin Plan Amendments

Additional Considerations for Implementation Schedule

- Allow sufficient time for :
  - Agreements regarding cost sharing and coordination
  - Pre-monitoring to prioritize, and pre-planning for next Phase/reach (Some can be done in parallel with completing implementation actions in prior reach)
  - Allow time for post-action, RWQCB review and determination if BPA and/or additional actions are needed

Next Steps

- Refine Estimate of Number of Drains
  - Complete development of allocations
  - Complete Monte Carlo analysis
- Develop timeframe and costs
  - Actions (LFDs)
  - Assessment
- Develop Implementation Plan
  - Regulatory language
  - Example Load Reduction Strategy

Discussion

- Are we looking at the right building blocks?
- Time and Cost Considerations
  - Plan
    - Monitoring and Load Reduction Strategy
  - Execute
    - Number of priority outfalls in watershed
    - Actions to address priority outfalls
  - Assess
    - Monitoring and Load Reduction Strategy
    - TMDL Reopeners

Discussion