



PROGRAMMATIC MONITORING/MODELING DESIGN TO ADDRESS THE NEW FOCUS FOR MANAGEMENT QUESTIONS

May 29, 2014

L. McKee

J. Hunt

SOURCES PATHWAYS AND LOADINGS
WORKGROUP MEETING
SPRING 2014



QUESTIONS FOR THE WORKGROUP

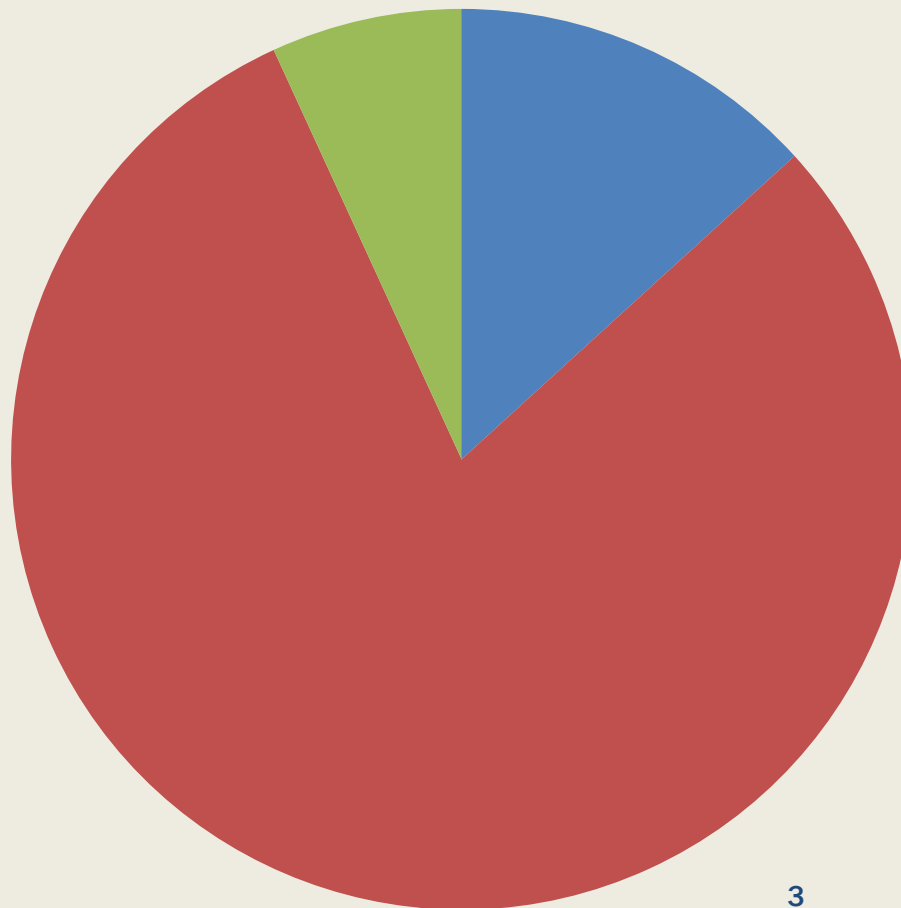
- Q1.** Do the programmatic elements from the previous five-year term remain appropriate for addressing the key management questions going forward?
- Do we have the right balance?
 - Other program elements missing?
- Q2.** Is the proposed report outline suitable for synthesizing current knowledge and supporting recommendations and rationale for refocused monitoring/ modeling components?
- Any missing report elements?
 - Other tried and tested analytical or interpretive methods?





PREVIOUS PROGRAMMATIC DESIGN

e.g. WY 2014 RMP SPLWG Effort

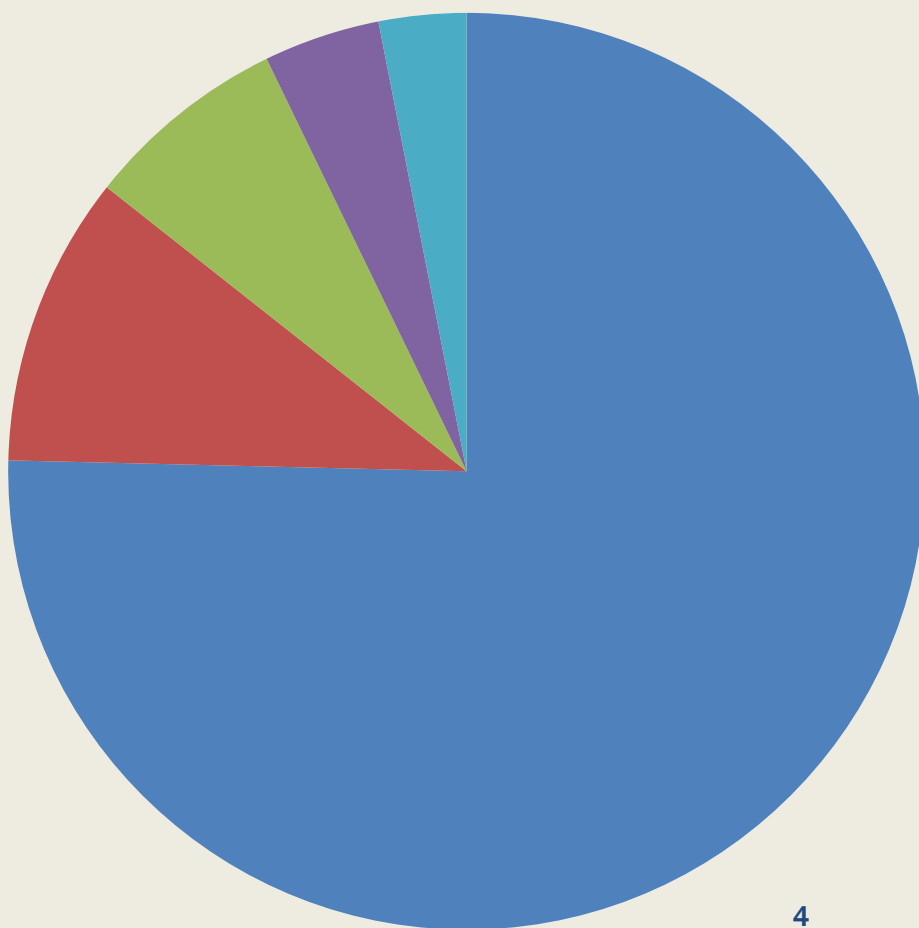


- MQ 1 - Identify high leverage watersheds/ areas
- MQ2a: Quantify base line concentrations & loads in single (no regret) watersheds
- MQ2b. Estimate regional scale loads to support TMDLs
- MQ3. Measure trends
- MQ4. Project impacts of management actions



PROPOSED FUTURE PROGRAM DESIGN

Proposed WY 2015-19 RMP SPLWG Effort



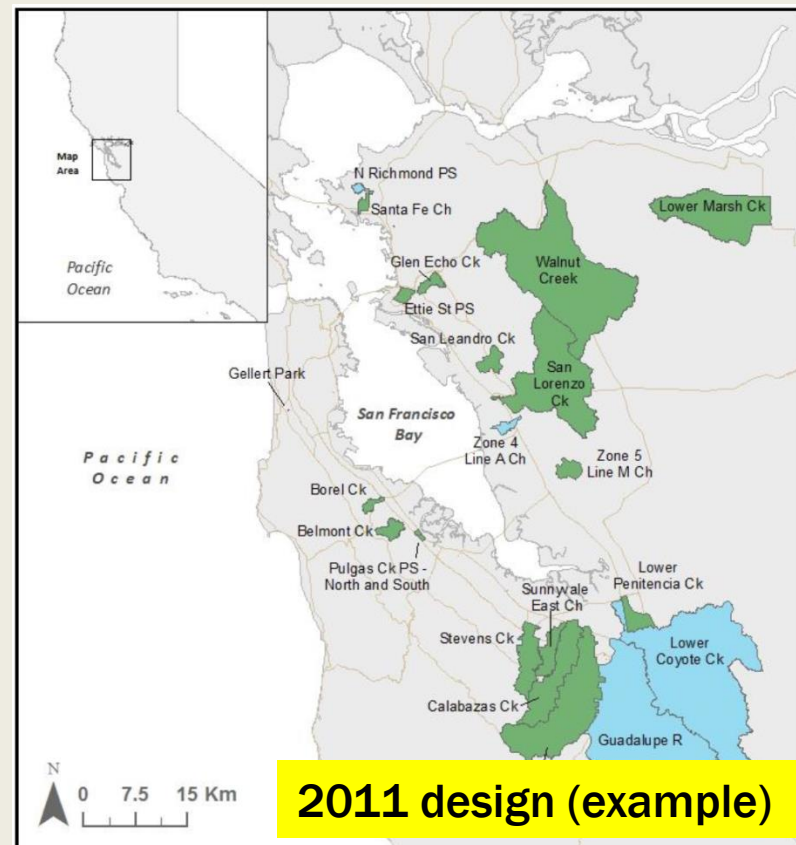
- MQ 1 - Identify high leverage watersheds/ areas
- MQ2a: Quantify base line concentrations & loads in single (no regret) watersheds
- MQ2b. Estimate regional scale loads to support TMDLs
- MQ3. Measure trends
- MQ4. Project impacts of management actions



NEXT PERMIT PROPOSED DESIGN: MQ 1

| Effort | Time Period | Level of Effort |
|-----------------------------|---------------|-----------------|
| Characterization monitoring | WY2015-WY2018 | 67% |

- Monitoring at catchment or sub-catchment (focusing on smaller industrialized areas)
- 1 or 2 storms per site
- 20-25 locations/year
- Revisiting locations only where evidence suggests inadequate characterization
- **5 Year Outcome:** A large number of locations characterized
- Note, parallel work on MQ1 may occur through Bay Margins foodwebs model or other special studies data

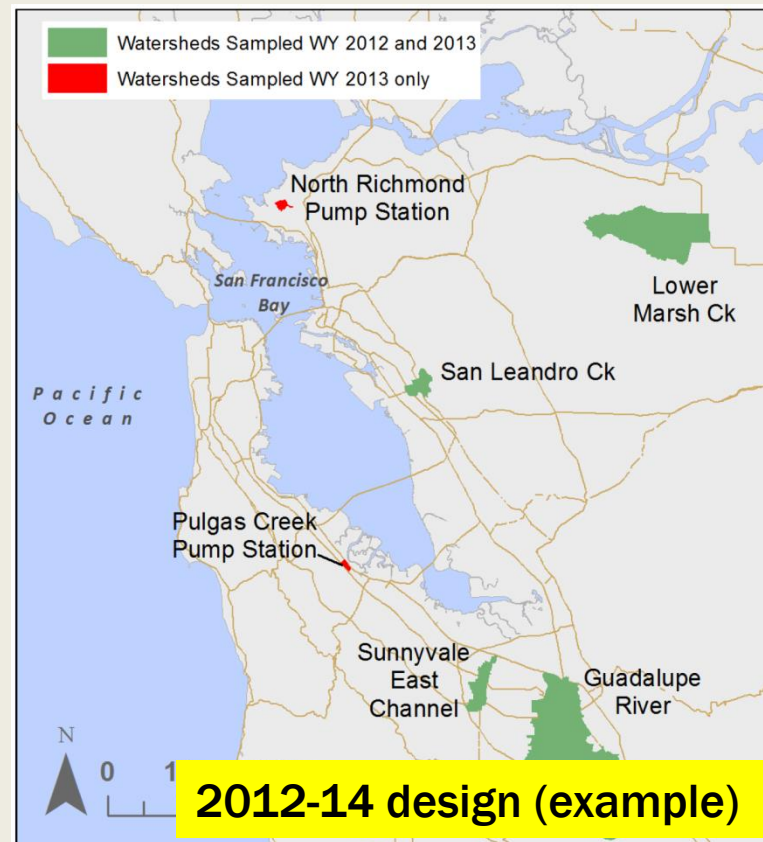




NEXT PERMIT PROPOSED DESIGN: MQ 2A

| Effort | Time Period | Level of Effort |
|------------------|---------------|-----------------|
| Loads monitoring | WY2015-WY2018 | 9% |

- Monitoring at catchment outlets using same monitoring technique proposed for MQ1.
- Strategically sample 1 site/year at watersheds with existing USGS gauges
- Revisiting locations only where evidence suggests inadequate characterization
- **5 Year Outcome:** First order load estimates for larger watersheds

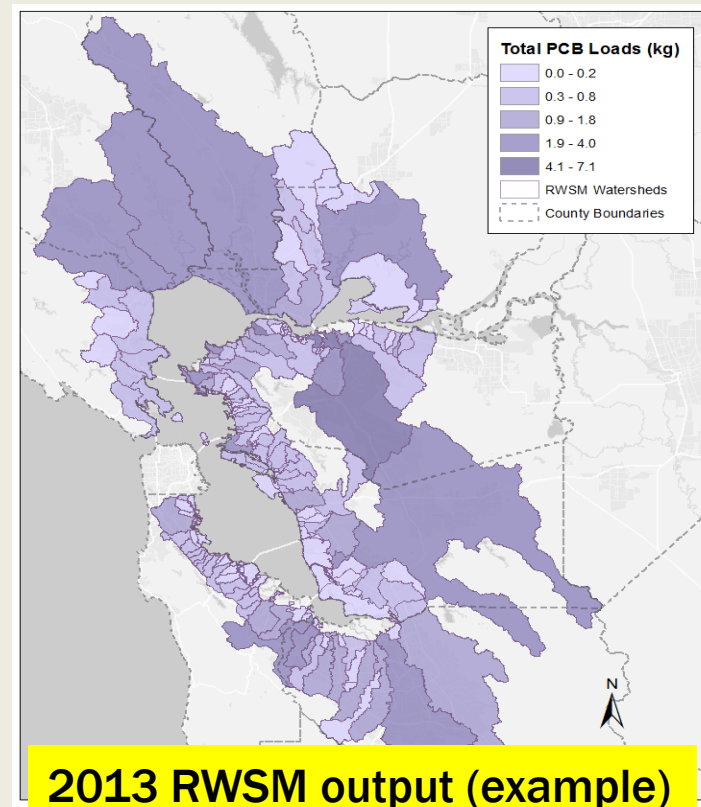




NEXT PERMIT PROPOSED DESIGN: MQ 2B

| Effort | Time Period | Level of Effort |
|----------|---------------|-----------------|
| Modeling | WY2015-WY2018 | 6% |

- Refinement of PCB & Hg RWSM
 - Primary use for (sub) regional PCB and Hg loads
 - Possible use for identifying high leverage watersheds, land uses, and source areas?
- Possible additional use for loads:
 - Selenium
 - Nutrients
 - CECs?
- Possible further development for MQ4
- 5 Year Outcome: Planning level load estimates for the region

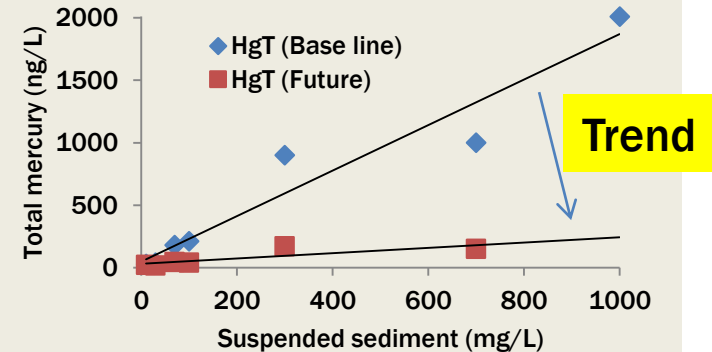




NEXT PERMIT PROPOSED DESIGN: MQ3

| Effort | Time Period | Level of Effort |
|------------------|---------------|-----------------|
| Loads monitoring | WY2015-WY2018 | 4% |

- Funding each year to support trend analysis and measure management effectiveness
 - Guadalupe River at Highway 101
 - Monitor when predicted rainfall intensity in excess of 2 inches/hour in historic mining district
- Other watersheds to be determined
- Further explore the power to detect trends based on existing baseline data



| Year | Number of Years to Reach Target | PCBs | |
|------|---------------------------------|---------------------------------|---------------------------|
| | | Power for Current Sample Size** | Power for n = 7 n = 10 |
| 2007 | 10 | 95 | 66 79 |
| | 20 | 100 | 90 97 |
| | 25 | 100 | 95 99 |
| | 40 | 100 | 99 100 |
| 2008 | 10 | 100 | 91 97 |
| | 20 | 100 | 100 100 |
| | 25 | 100 | 100 100 |
| 2009 | 10 | 100 | 100 100 |
| | 20 | 100 | 100 100 |
| | 25 | 100 | 100 100 |
| | 40 | 100 | 100 100 |



NEXT PERMIT PROPOSED DESIGN: MQ 4

| Effort | Time Period | Level of Effort |
|---------------------|---------------|-----------------|
| Management measures | WY2015-WY2018 | 3% |

- Methodological decision to be determined

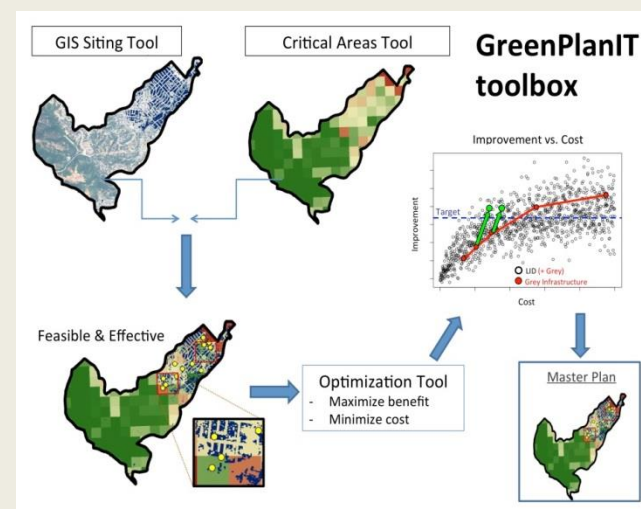
Options include:

- Adoption, refinement, or added support for a BASMAA developed methodology
- Further development of the RWSM
- Adoption of an alternative modelling platform (SWMM) building upon the GreenPlanIT tool.

BASMAA, 2014

| Initial Classification | Class (PCB Yield) | Known Elevated PCB Watersheds (330 mg/acre) | Old Industrial (50 mg/acre) | Old Urban (17.5 mg/acre) | New Urban & Other (2 mg/acre) | Open Space (2.5 mg/acre) |
|--|-------------------|---|-----------------------------|--------------------------|-------------------------------|--------------------------|
| Redistribution | Acres | 543 | 6,375 | 117,016 | 33,651 | 121,552 |
| Revised Classification for Scenarios A & B | Class (PCB Yield) | O (1) | | | | |
| | Acres | | | | | |
| | PCB Load (%) | | | | | |

| Control Measure | High Opportunity Areas Addressed | Estimated Load Reduction (g PCB) | Estimated Load Reduction ² | % Countywide Load Reduced ³ | Estimated Cost Effectiveness (\$/g PCB removed) | Estimated Annual Cost to Permittees* (\$/Year) | Estimated Cost to Permittees Over 20 Years (\$) |
|---|----------------------------------|----------------------------------|---------------------------------------|--|---|--|---|
| Source Property ID and Abatement ⁴ | 10% (33 acres) | 33 | 10% | 1.1% | \$1,900 (\$480 - \$3,600) | \$62,000 (\$15,000 - \$120,000) | \$186,000 (\$45,000 - \$360,000) |
| Enhanced Street Sweeping | 50% (163 acres) | 24 (8 - 38) | 7.5% (2.5% - 12%) | 0.8% (0.3% - 1.3%) | \$2,100 (\$480 - \$6,400) | \$50,000 (\$18,000 - \$51,000) | \$1M (\$360,000 - \$1M) |
| Stormwater Treatment Retrofits | 40% (131 acres) | 95 (72 - 118) | 30% (23% - 37%) | 3% (2.5% - 4%) | \$39,000 (\$19,000 - \$67,000) | \$3.7M (\$1.4M - \$7.9M) | \$74M (\$27M - \$160M) |
| Totals | 100% (327 acres) | 151 (112 - 189) | 46% (34% - 58%) | 5% (4% - 6.5%) | \$25,000 (\$13,000 - \$43,000) | \$3.8M (\$1.4M - \$8M) | \$76M (\$29M - \$160M) |





MULTIYEAR SYNTHESIS REPORT

- **Sources, Pathways and Loadings: Multi-Year Synthesis**
 - Concise summary of progress to-date on addressing management questions
 - Document information gaps
 - Document the rationale for changing priority focus
 - Document justification for proposed changes to the monitoring and modeling elements to support further information development during the next five year permit term

Draft for review

Table of Contents

1. **Introduction**
 - 1.1. Impetus and objectives of this report
 - 1.2. Structure of this report
 - 1.3. Overview of the evolution of watershed sources, pathways, and loads information development (pre-2009) and development of the priority management questions
 - 1.4. Development and implementation of the Strategy (MRP 1.0)
2. **Which Bay tributaries (including stormwater conveyances) contribute most to Bay impairment from POCs?**
 - 2.1. Where are the sensitive areas (embayments or margins defined by high sediment or biota concentrations or populations) that are disproportionately impacted by pollutant loads?
 - 2.2. Which watersheds are disproportionately producing loads?
 - 2.3. Which land uses or source areas are disproportionately producing loads?
 - 2.4. Which patches or parcels are disproportionately producing loads?
3. **What are the annual loads or concentrations of POCs from tributaries to the Bay?**
 - 3.1. What are the watershed scale concentrations?
 - 3.2. What are the watershed scale loads?
 - 3.3. What are the regional/sub-regional scale loads?
4. **What are the decadal-scale loading or concentration trends of POCs from small tributaries to the Bay?**
 - 4.1. Where could trends be measured?
 - 4.2. What is the appropriate media and metrics upon which to measure trends and what constitutes a suitable baseline against which to measure future changes in relation to management effort and "natural" environmental attenuation?
 - 4.3. What data have been collected to-date which may serve as baseline data?
5. **What are the projected impacts of management actions (including control measures) on tributaries and where should these management actions be implemented to have the greatest beneficial impact?**
 - 5.1. What management actions are available and under what scenarios is one action preferable to another?
 - 5.2. How effective is each type of management action at reducing POC loads?
 - 5.3. Which actions have multiple benefits and what are the multiple benefits?
 - 5.4. Where are the most cost-effective sites where the opportunities to implement management actions and reduce loads to sensitive Bay margins intersect?
6. **Summary and recommendations**

Sources, Pathways and Loadings: Multi-Year Synthesis

Prepared by:
Lester Macken, Alicia Gilbreath, Jennifer Hart, and Eric Wu
San Francisco Estuary Institute, Marinwood, California
Date: 2014
For:
Bay Area Stormwater Management Agencies Association (BSMAA)
Regional Monitoring Program for Water Quality in San Francisco Bay (RMP)
Sources Pathways and Loadings Strategy (SPLS)
Small Tributaries Loading Strategy (STLS)

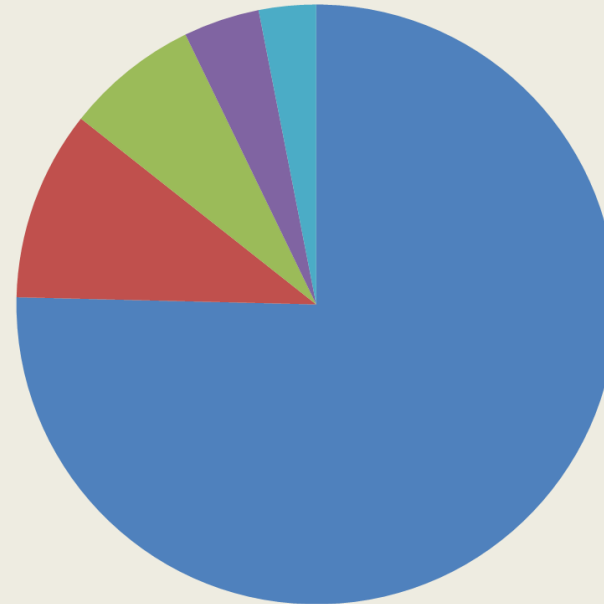
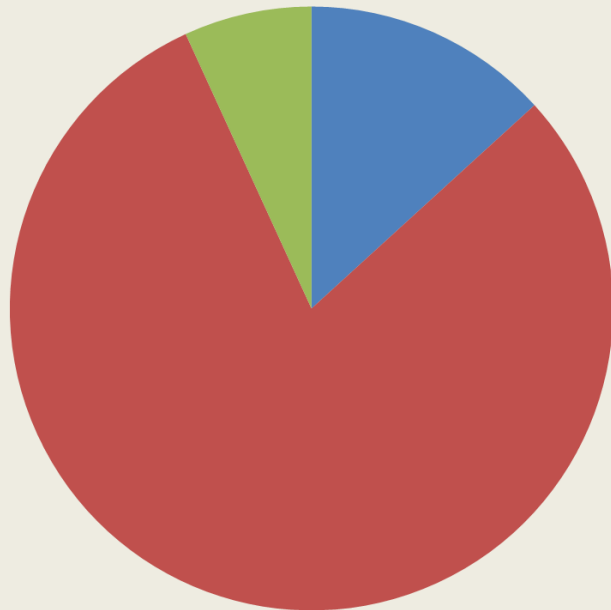


SUMMARY – PROGRAMMATIC SHIFT

Previous Focus of Effort



Proposed WY 2015-19 RMP SPLWG Effort



- MQ 1 - Identify high leverage watersheds/ areas
- MQ2a: Quantify base line concentrations & loads in single (no regret) watersheds
- MQ2b. Estimate regional scale loads to support TMDLs
- MQ3. Measure trends
- MQ4. Project impacts of management actions



QUESTIONS FOR THE WORKGROUP

- Q1.** Do the programmatic elements from the previous five-year term remain appropriate for addressing the key management questions going forward?
- Do we have the right balance?
 - Other program elements missing?
- Q2.** Is the proposed report outline suitable for synthesizing current knowledge and supporting recommendations and rationale for refocused monitoring/ modeling components?
- Any missing report elements?
 - Other tried and tested analytical or interpretive methods?





QUESTIONS FOR THE WORKGROUP

- Q1. Do the programmatic elements from the previous five-year term remain appropriate for addressing the key management questions going forward?
- Do we have the right balance?
 - Other program elements missing?

Half the remaining time to discuss





QUESTIONS FOR THE WORKGROUP

Half the remaining time to discuss

- Q2. Is the proposed report outline suitable for synthesizing current knowledge and supporting recommendations and rationale for refocused monitoring/ modeling components?
- Any missing report elements?
 - Other tried and tested analytical or interpretive methods?

