Revised Willamette Basin Mercury Total Maximum Daily Load – Proposed Allocations

Water Quality, TMDL Program

April 26, 2019
Portland State Office Building

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Willamette River Basin Hg TMDL

Proposed Allocations

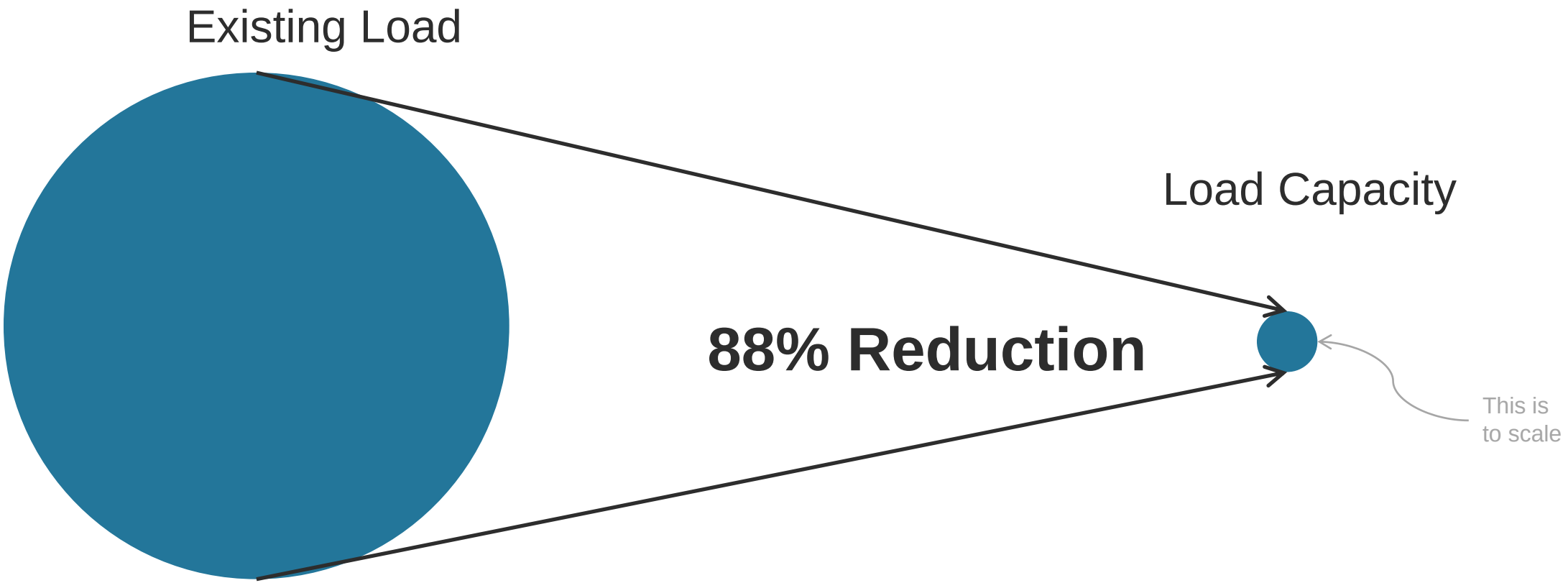
April 26, 2019

Kevin Brannan | Oregon Department of Environmental Quality

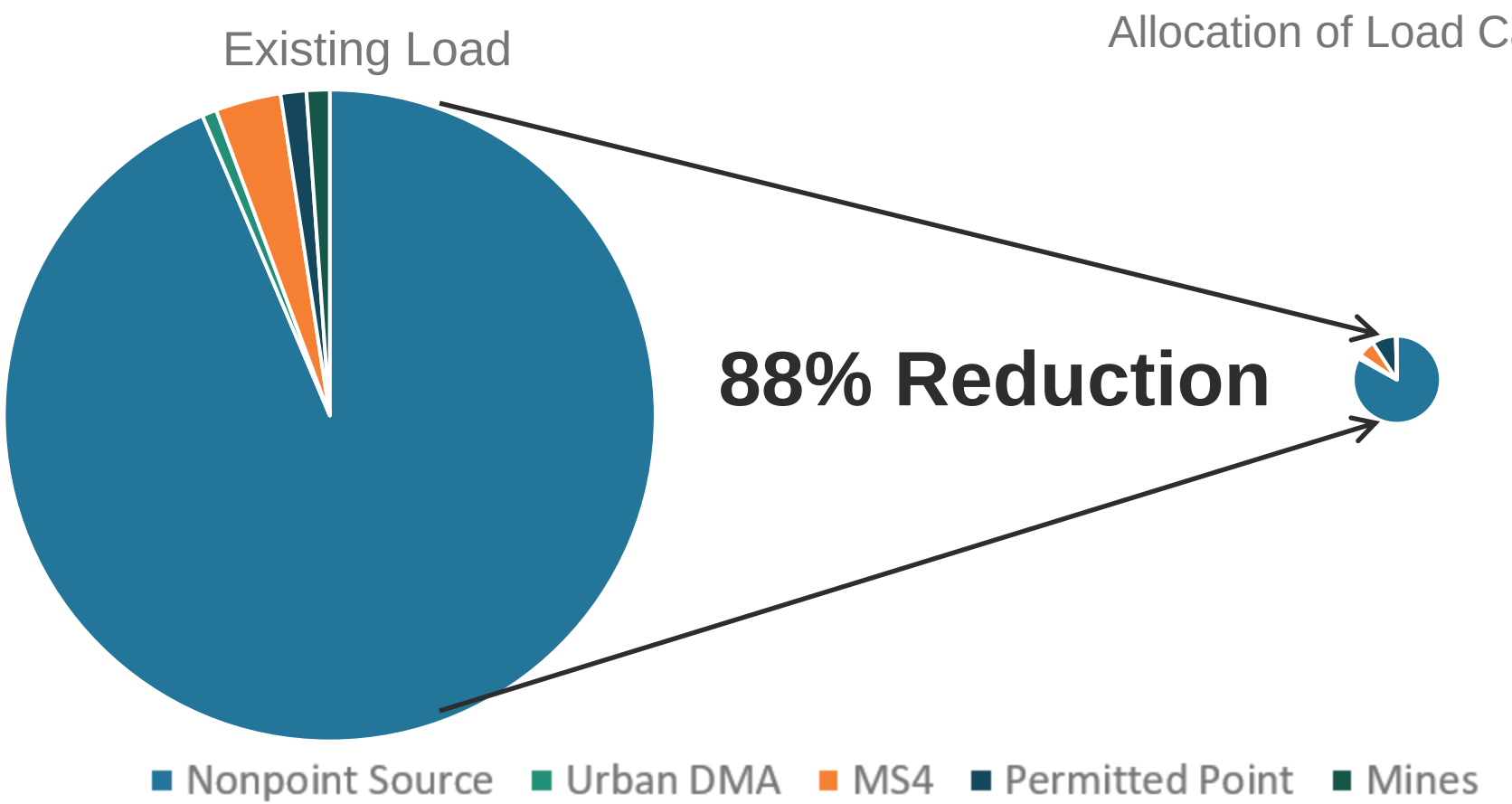
Load Capacity

- Amount of a pollutant or pollutants that a waterbody can receive and still meet water quality standards
- Require a 88% reduction overall THg load
- Using single load capacity for entire basin

Load Capacity: Overall Reduction



Load Capacity: Overall Reduction



Factors considered in Allocation

- How the waste load allocation was being applied
- Atmospheric deposition is a major source of THg throughout Willamette River Basin
- The deposition generally follows precipitation patterns and does not result in specific ‘hotspots’
- Equity across locations within the basin

Allocation Calculation

- Used results from mass-balance model to get source loads and transport
- Considered many transport and generation processes important to the movement of THg to, within, and through the basin
- USEPA consultant made spreadsheet to calculate loads for different allocations and compare to Load Capacity
- Tried different reductions for LA and WLA
- Used optimization tool to refine LA and WLA components

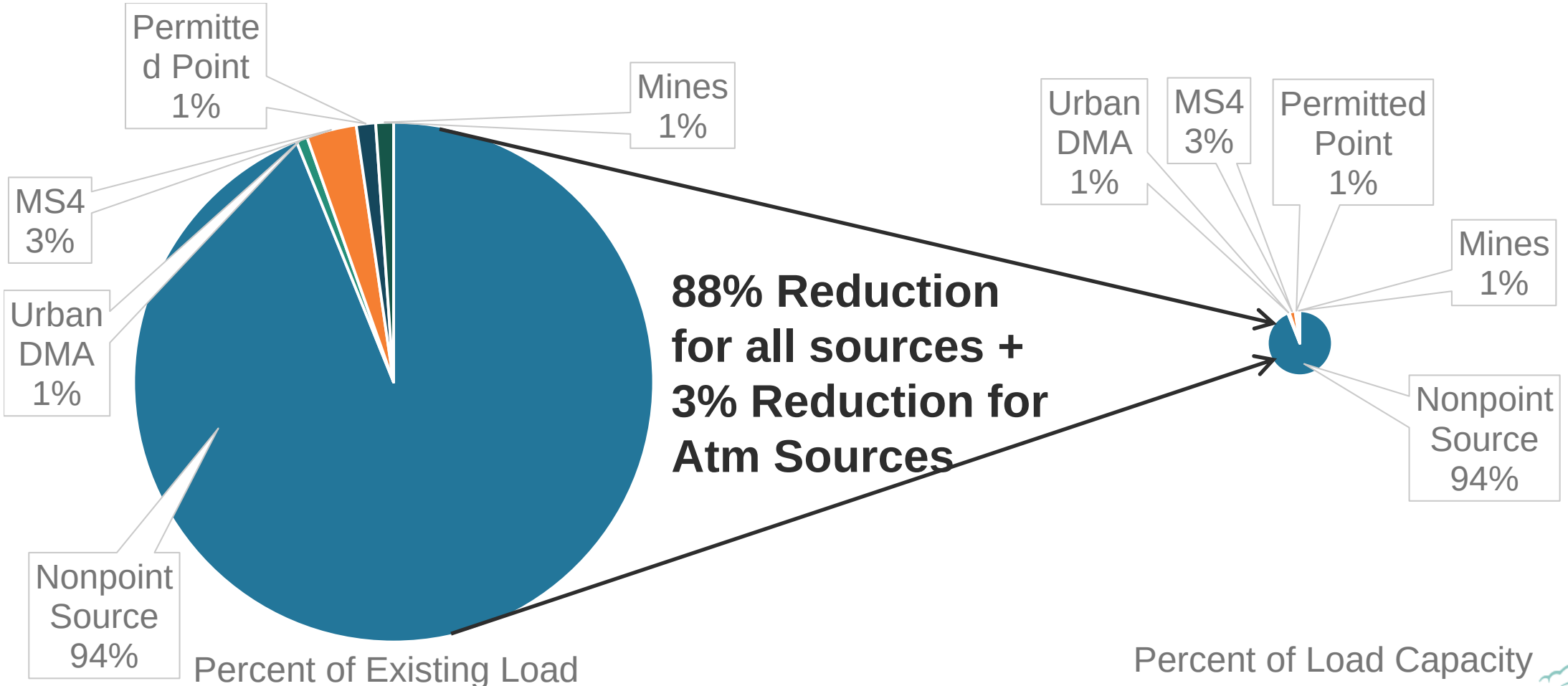
Proposed Allocation

Sector	Allocation (% Reduction)
General Nonpoint Source • Forestry • Agriculture • Water Impoundments/dams • Water Conveyance entities • Background sources of mercury	88%
Mining	95%
Non-Permitted Urban Stormwater	75%
Atmospheric deposition	10%
NPDES wastewater dischargers	10%
MS4 stormwater dischargers	75%

Allocation Alternatives: Maintain Relative Contributions

Sector	Allocation (% Reduction)
General Nonpoint Source • Forestry • Agriculture • Water Impoundments/dams • Water Conveyance entities • Background sources of mercury	88%
Mining	88%
Non-Permitted Urban Stormwater	88%
Atmospheric deposition	3%
NPDES wastewater dischargers	88%
MS4 stormwater dischargers	88%

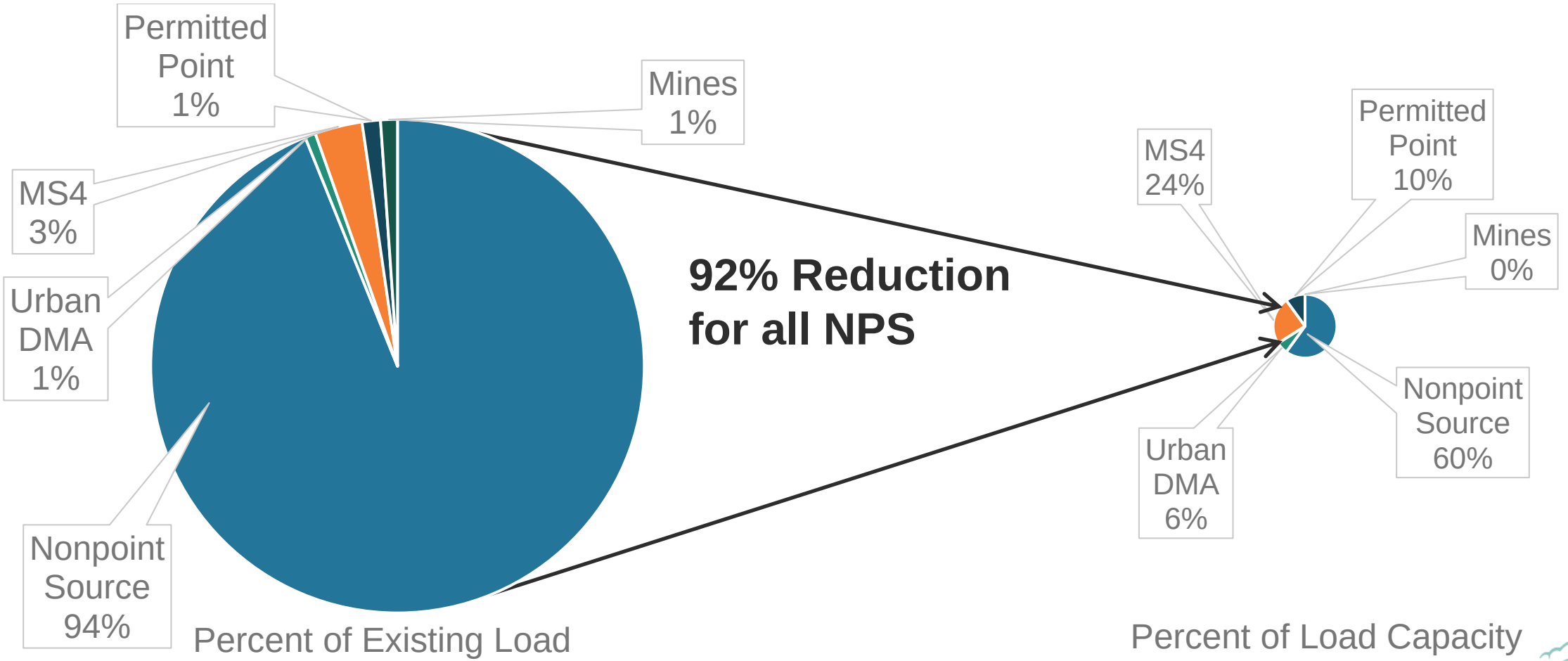
Maintain Relative Contributions



Allocation Alternatives: Use Relative Contributions as Reductions

Sector	Allocation (% Reduction)
General Nonpoint Source • Forestry • Agriculture • Water Impoundments/dams • Water Conveyance entities • Background sources of mercury	92%
Mining	100%
Non-Permitted Urban Stormwater	1%
Atmospheric deposition	0%
NPDES wastewater dischargers	1%
MS4 stormwater dischargers	3%

Use Relative Contributions as Reductions



Proposed Allocation

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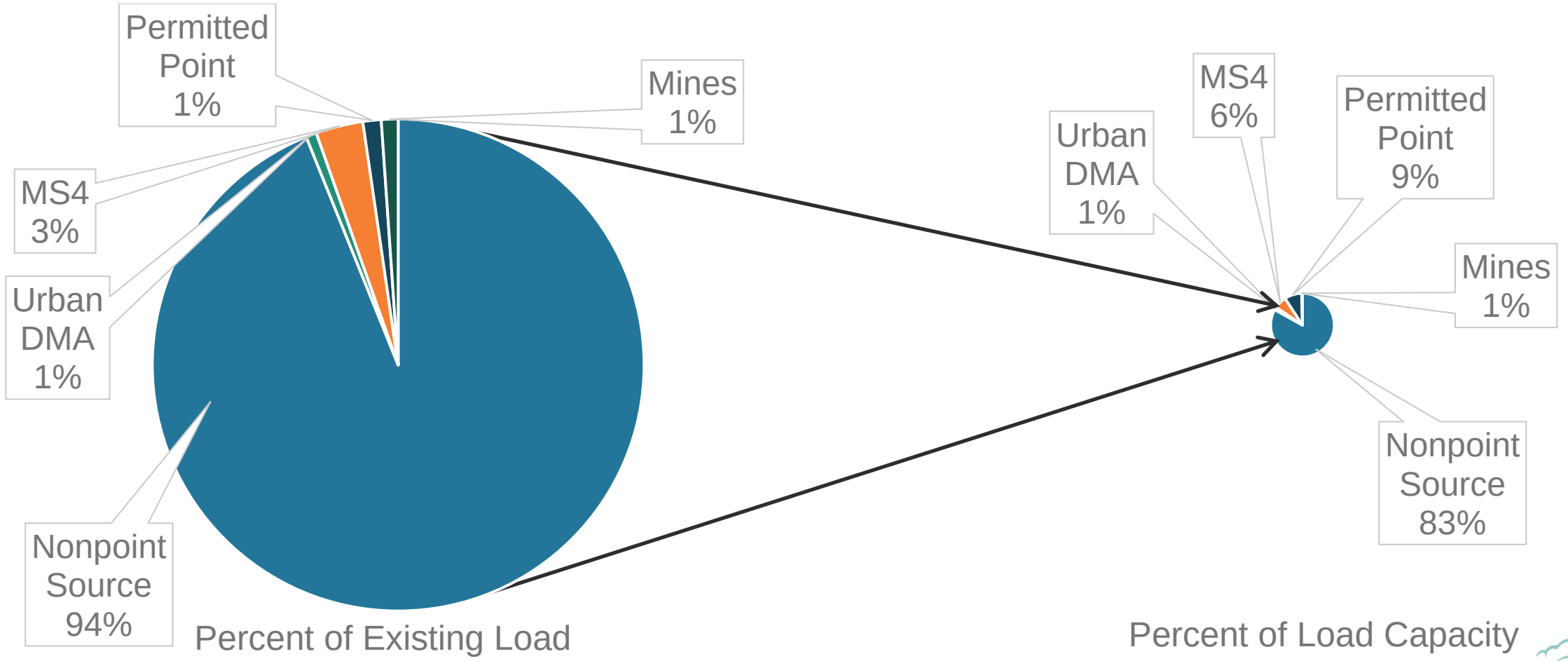
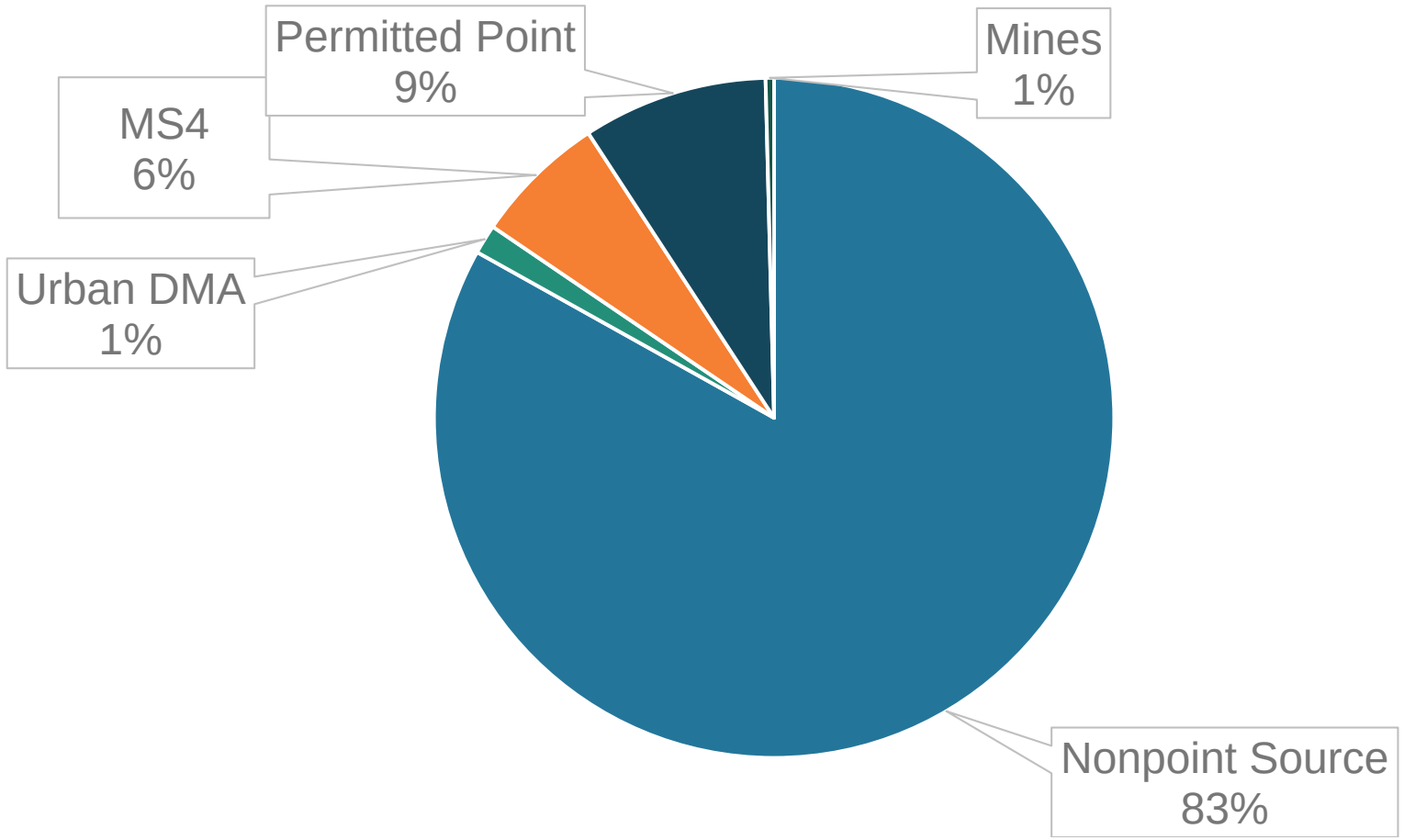
MS4 stormwater dischargers	75%

Proposed Allocations



Load Capacity Allocation by Source



Willamette River Basin Hg TMDL

Key policy choices and rationale

April 26, 2019

Gene Foster | Oregon Department of Environmental Quality

Allocation Approach: Basin-wide vs. HUC8 Scale

- Differential number of data points between HUCs
- Differential years for when data was collected
- More power in the data for allocations at the basin scale
- HUC8 level data will be useful for implementation planning
- Either basin wide or HUC8 allocations would protect beneficial uses and meet mercury water quality standards

Definition of Background Sources

OAR 340-042-0030(1) “Background Sources” include all sources of pollution or pollutants not originating from human activities. In the context of a TMDL, background sources may also include anthropogenic sources of a pollutant that the Department or another Oregon state agency does not have authority to regulate, such as pollutants emanating from another state, tribal lands or sources otherwise beyond the jurisdiction of the state.

Fish Species Target

Northern Pikeminnow selected because it had the highest bioaccumulation factor but still similar to other fish evaluated, therefore:

- Used as an implicit Margin of Safety;
- Would meet mercury fish tissue, water column, and narrative water quality standards
- Would be protective of the most sensitive beneficial uses including humans, wildlife, and aquatic life
- NPM is not a popular commercial target, but may be consumed by recreational or subsistence fishermen and wildlife

Reasonable Assurance

Reasonable Assurance is a state and federal requirement for TMDLs and is:

- A demonstration that a TMDL will be implemented by federal, state or local governments or individuals through regulatory or voluntary actions
- A description that management strategies and sector-specific or source-specific implementation plans will be implemented
- The TMDL is established at a level necessary to implement the applicable water quality standard
- Mechanisms will be applied so that pollution reduction levels in the TMDL are achieved and applicable WQS are attained

Aggregating Allocations by Sector

- EPA guidance: Aggregating allowed when atmospherically deposited mercury is the dominant source and point source loads are less than 10% of the total mercury load.
- For consistency, a single reduction was also used for nonpoint source sector-specific load allocations.
- General Nonpoint Source Sector (agriculture, forestry, reservoirs, water conveyances, groundwater, background) – current analysis cannot distinguish between these sources, so aggregating reductions is appropriate.

Revised Willamette Basin Mercury Total Maximum Daily Load Waste Load Allocations Approach

Water Quality, TMDL Program

April 26, 2019
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Alex Liverman | Oregon Department of Environmental Quality

EPA Guidance on Mercury TMDLs and Implementing Mercury Water Quality Criteria

- EPA's Guidance for implementing the January 2001 Methylmercury WQ Criterion (2010)
- EPA's Memo on Elements of Mercury TMDLs Where Mercury Loadings are Predominantly from Air Deposition (2008)
- EPA's Memo Revisions to the November 22, 2002 Memo Establishing TMDL WLAs for Stormwater Sources and NPDES Permit Requirements Based on Those WLAs (2014)

Other States' Mercury Loads and WLAs

STATE	TOTAL LOAD	PS LOAD	MS4 LOAD	WLA
Michigan 2018 (statewide)	992.3 kg/yr	4% of total = 39.3 kg/yr	Implicitly included in NPS load	Aggregate PS 6.0 kg/yr + MMP toward 15% reduction using Multi Discharger Variance MS4 addressed by air emissions reductions and BMPs in permits
Florida 2014 (statewide)	4793 kg/yr	<0.5% of total = 23 kg/yr	Not Applicable	Aggregate PS 23 kg/yr + MMP for >1 MGD facilities MS4 no reductions, unless sources under control of permittee found
South Dakota 2015 (statewide)	595 kg/yr	0.43% of total = 2.53 kg/yr *(Estimated from literature values)*	Accounted for in LA	PS load is de minimus, so WLA reductions not calculated or required (all reductions NPS) MS4 do 6 minimum measures
Georgia 2001 (Savannah Watershed	58.8 kg/yr	1% of total = 0.59 kg/yr (1.62 g/d)	Not addressed	Aggregate PS 0.3 kg/yr for 29 > 1 MGD facilities (no WLA for < 1 MGD facilities) = EL based on WQS or MMP

Examples of WLA Scenarios Considered

WLA SCENARIO	REASONING/CONSIDERATIONS
0% reduction Wastewater (PS) & Stormwater (MS4) + Add 4% reduction to Nonpoint source reductions	Technically infeasible because 4 HUC8s require more than 100% reduction from NPS (Middle Willamette, Tualatin, Lower Willamette, Columbia). Inequitable.
0% reduction for all HUC8s except aggregate reductions in 4 focus areas: • Middle Willamette 20% PS & 30% MS4 • Tualatin 50% PS & 80% MS4 • Lower Willamette 60% PS & 90% MS4 • Columbia 50% PS & 80% MS4	Includes most MS4s and PSs, but requires very large reductions at facilities that have already achieved reductions thru MMPs and requires no reduction from facilities that have not yet implemented MMPs. Differing reductions in various HUC8 areas will be difficult to implement and track. Inequitable.
Maintain aggregated proportions of total load: • PS 60% reduction • MS4 86-95% reduction (varies by HUC8)	Allows reductions proportional to existing loads (PS 1% & MS4 3%), but requires larger PS/MS4 reductions as NPS loads are reduced. Differing reductions in various HUC8 areas will

Willamette Mercury TMDL Allocations

Sector	Allocation (% Reduction)	LA/WLA
General Nonpoint Source • Forestry • Agriculture • Water Impoundments/dams • Water Conveyance entities • Background sources of mercury* (see definitions)	88%	LA
Mining (NPS)	95%	LA
Non-Permitted Urban Stormwater (NPS)	75%	LA
Atmospheric deposition (NPS)	10%	LA
NPDES wastewater dischargers (PS)	10%	WLA
MS4 stormwater dischargers (PS)	75%	WLA

Waste Load Allocation Approach

- Application of mercury and erosion minimization and control measures appropriate to the sector, facility, land use, or activity will be most effective for optimizing reductions.
- Permittees are responsible for applying controls with measurable objectives linked to activities that contribute to the total mercury load from their facilities/jurisdictions. Goal is to show progress towards 10% and 75% reduction as overall sectors.

Point Source Assessment

NPDES Wastewater Permits

- **23 Major & 47 Minor STPs**
- **8 (6 active) Major & 56 Minor Industrials**
- **158 General Wastewater**
- **31 700PM Registrants**

NPDES Stormwater Permits

- **8 MS4 Phase I** (implemented by 33 jurisdictions)
- **14 MS4 Phase II** (most registrants of general permit, a few individual permits)
- **General Stormwater Permits**
  - **Approximately 109 1200A**
  - **Approximately 629 1200Z**
  - **Approximately 1000 1200C/CN/CA**

Stormwater WLA Implementation

MS4 Phase I

- Implement mercury minimization and erosion control measures
- Monitor paired Total Mercury and Total Suspended Solids (TSS)
- Report data and BMP effectiveness analysis

MS4 Phase II

- Implement the MS4 Phase II general permit, effective March 2019, or
- For individual Phase II permit coverage:
  - Develop and implement mercury minimization and erosion control measures
  - Monitor and report BMP effectiveness

General Stormwater (1200A, 1200Z, 1200C/CN/CA)

- Loads implicit to MS4 loads – existing requirements to control erosion and TSS

Wastewater WLA Implementation

Major STPs and Industrials with activities that may increase Hg in discharge and adequate data

- determine effluent level currently being achieved
- implement mercury minimization plan (MMP)
- monitor Total mercury
- report data & MMP effectiveness measures

Industrials with activities that may increase Hg in discharge, but insufficient data

- monitor Total mercury
- after 2 years, determine potential load and level currently being achieved
- MMP, if warranted – implement at next permit renewal
- report data and, if applicable, MMP effectiveness measures

700PM

- In addition to prohibition of suction dredging in streams 303(d) listed for mercury, also prohibit suction dredging in streams tributary to Dorena Reservoir

SIC Categories that may increase mercury in discharge:

- **timber products**
- **paper products**
- **chemical products**
- **glass/clay/cement/concrete/gypsum products**
- **primary metal industries**
- **fabricated metal products**
- **electronics and instruments**

Multi Discharger Variance

- Concurrent with TMDL revision, DEQ undertaking rulemaking on mercury variance for wastewater dischargers in the Willamette Basin
  - Human caused pollution that cannot be remedied or would cause more environmental harm than to leave in place
- Proposed for EQC adoption in 1st quarter of 2020
- Also requires EPA approval
- Parallel process for permit requirements

BREAK

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email deqinfo@deq.state.or.us.

Water Quality Management Plan

Nonpoint Source Proposed Implementation Approaches and Measurable Objectives

April 26, 2019

Water Quality Management Plan Overview

- The WQMP (OAR 340-042-0040(4)(l)):
  - Implements the TMDL
  - Not approved by EPA
  - Contains the framework for NPS and PS proposed management strategies to attain water quality standards
  - Tracks: measurable objectives, timelines, schedules, etc.
  - Provides reasonable assurance that management strategies will be carried out through regulatory and voluntary actions

Water Quality Management Plan Overview, cont.

- Identifies designated management agencies or responsible persons
  - DMAs or RPs are any entity with legal authority over a sector or source of water pollutant
  - Responsible for developing an implementation plan to meet load reductions over time
  - 150+ DMAs identified in Hg TMDL

Implementation Plans

Are the DMA's game plan for implementing the WQMP:

- DMAs/RPs identify specific management strategies to achieve % Hg reductions needed
- Include timelines to implement strategies and schedule for completing measurable milestones
- Performance monitoring with plan for review and revision of IP
- New/updated IPs due 18 months after TMDL issuance. Reviewed and approved by DEQ

Forest Practices Act

city/county IPs

WQ Restoration Plans

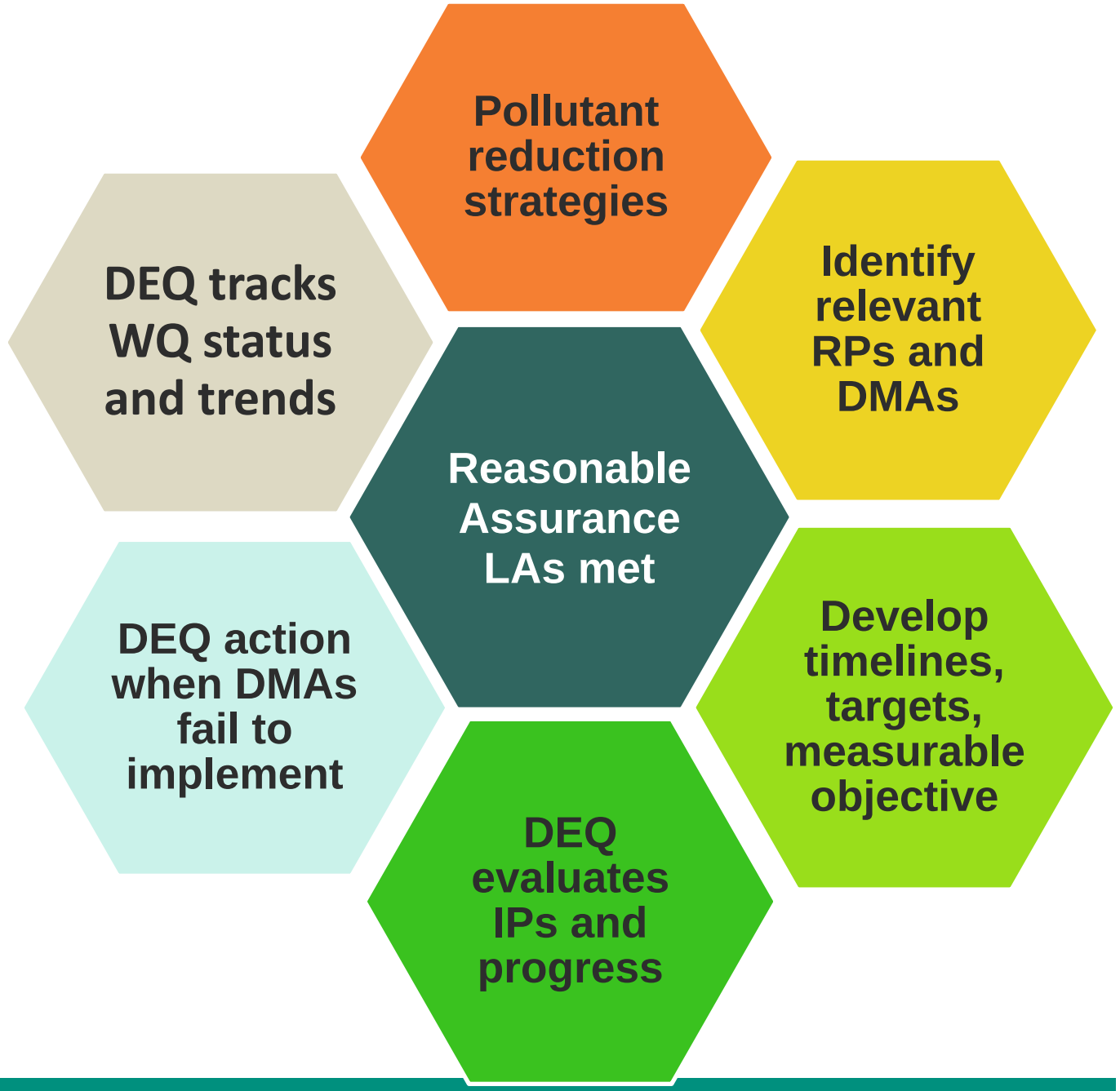
Ag. Area Plans and Rules

Measurable Objectives and Milestones

- Specific and measurable, rather than broad or intangible
- Outcome-based

→ WQMP will contain language directing NPS DMAs to develop measurable objectives and milestones associated w/ erosion and runoff in their respective Implementation Plans.

Actions in WQMP and Implementation Plans = Accountability Framework



April meetings with NPS DMAs

- DEQ staff met with ODA, ODF, BLM and USFS:
  - Discussed proposed NPS load allocations
  - Discussed measurable objectives and milestones
- Oregon Water Resource Council
  - Water conveyance districts as responsible persons in TMDL
- March 21 stormwater webinar for non-permitted urban DMAs
- Reservoir meeting

Urban Stormwater Sector

(non MS4 communities)

Mercury in Stormwater

- Large communities were required to collect mercury in stormwater (i.e. “MS4 Phase I permit holders)
  - Median value of total mercury: 4.62 ng/L (*n = 655*)
  - TMDL water column target = 0.14 ng/L

- Modeling indicates that mercury in SW is primarily a function of erosion and runoff from atmospheric dep. of mercury, rather than specific sources in large urban areas

- DEQ concludes mercury is also present in smaller urban communities and could contribute to water quality impairments

Proposed Approach: Applicability

Small cities and counties should also control stormwater to reduce mercury

- 2006 WQMP required non-permitted MS4 communities greater than10K to implement stormwater control measures

- DEQ is proposing stormwater control measures for communities greater than 5K.

Proposed Approach: Applicable Communities (21)

According to PSU's 2018 certified population estimates (>5K):

1. Canby
2. Columbia County
3. Cottage Grove
4. **Dallas**
5. Lebanon
6. McMinnville
7. **Newberg**
8. St. Helens
9. **Woodburn**
10. Sandy
11. Silverton
12. Yamhill County
13. Creswell
14. Independence
15. Junction City
16. Molalla
17. Monmouth
18. Scappoose
19. Sheridan
20. Stayton
21. Sweet Home

Bolded text = had SW requirements in 2006 TMDL

Proposed Approach: Implement Six Stormwater Control Measures

1. Pollution Prevention and Good Housekeeping for Municipal Operations
2. Public Education and Outreach
3. Public Involvement and Participation
4. Illicit Discharge Detection and Elimination
5. Construction Site Runoff Control
6. Post-Construction Site Runoff for New Development and Redevelopment

1 Pollution Prevention and Good Housekeeping for Municipal Operations

- ✓ Maintain city/county facilities, roadways, etc. using pollution prevention and good housekeeping practices to reduce discharge of pollutants through SW conveyance system

2 Public Education and Outreach

- ✓ Conduct an ongoing education and outreach program to inform the public about the impacts of stormwater discharges on waterbodies and the steps that they can take to reduce pollutants in stormwater runoff

3 Public Involvement and Participation

- ✓ Implement a public involvement and participation program

- ✓ Comply with public notice requirements when implementing a public involvement participation process

4 Illicit Discharge Detection and Elimination

- ✓ Implement and enforce a program to detect and eliminate illicit discharges into the stormwater conveyance system
- ✓ Develop and maintain a current map of the stormwater conveyance system
- ✓ Prohibit non-stormwater discharges into the stormwater conveyance system through enforcement of an ordinance or other regulatory mechanism
- ✓ Procedure to document all complaints or reports of illicit discharges into and from the stormwater conveyance system

5 Construction Site Runoff Control

- ✓ Construction sites one or more acres = 1200C permit
- ✓ Require Erosion and Sediment Control Plans for construction project sites that result in a minimum land disturbance of ½ acre or more (Phase II = ¼ ac)
- ✓ Implement and maintain a written escalating enforcement and response procedure

6 Post-Construction Site Runoff for New Development and Redevelopment

- ✓ Apply to project sites discharging stormwater to the stormwater conveyance system that create or replace ¼ acre (Phase II = approximately 1/8 ac.)
- ✓ Goal is to retain rainfall on-site and minimize the offsite discharge of precipitation (e.g. low impact development principles)
- ✓ Long term operation and maintenance requirements

What About Communities Less Than 5K?

- DEQ's expectation is that these communities will implement some erosion control practices and stormwater infiltration to control movement of mercury to waterbodies

- Under certain circumstances, DEQ may require cities to implement stormwater control measures

Proposed Implementation Schedule

- DMAs: Submit updated TMDL implementation plans within 18 months of TMDL approval (May 2021 time period)

- DEQ is proposing to allow more time to implement all 6 stormwater controls for communities between 5K and 10K (9.5 years) than for communities greater than 10K (4.5 years)

Forestry Sector

Forestry Management Measures

- Riparian rules
- Road management / culvert maintenance
- Fuels management (reduce catastrophic wildfires)
- Post-wildfire mitigation
- Steep slope protection, landslide prone areas
- Harvest practices
- Implementation/compliance monitoring
- Education and outreach to operators and landowners

Oregon Department of Forestry

- ODF relies on Forest Practices Act and Stewardship Foresters (via investigations and compliance monitoring) to meet TMDL load allocations for state and private forest operations
- FPA rules related to WQ and erosion control: treatment of slash, road construction and maintenance, harvesting, water protection
- FPA requirements are generally deemed not to cause violations of WQS
- Site specific rules under the FPA will need to be revised if DEQ determines that the generally applicable FPA rules are not adequate to implement the TMDL load allocations

ODF Example Measurable Objective

ODF Compliance monitoring: studies to evaluate landowner compliance with FPA

- 2013 – 2017: Road construction & maintenance, harvesting, vegetation retention along streams, wetlands
- Future work: Reforestation and repeat of 2013-2017 study

Example of measurable objective and milestone

- Target rules (related to sediment delivery) with < 90% compliance
- Develop training program and outreach to improve compliance

  Goal: 100% compliance
- Track compliance over time through compliance monitoring

BLM and USFS

- MOU agreements to ensure WQS, TMDLs and drinking water rules and regulations are met
- Identifies Water Quality Restoration Plans as the TMDL implementation plan
- Implement BMPs per respective management plans, standards, guidelines, design features and mitigation requirements
- Submit updated WQRPs within 18 mo. of TMDL issuance

BLM Example Measurable Objective

Bureau of Land Management – Transportation Infrastructure Improvement and Maintenance

Issue: The BLM transportation system is vulnerable to erosion if not properly maintained. Sediment mobilized from the road surface, transmitted through stream/road crossing or from road failures have the potential to adversely affect aquatic habitat, damage other infrastructure or mobilize mercury in the environment.

Measurable Objective: The BLM will develop a model that will help prioritize road restoration and maintenance by developing a triage approach (model) to prioritize repair and replacement of stream crossings given limited financial resources. The BLM will incorporate the modeled results and a strategic action plan into our existing aquatic restoration strategies by 202X.

USFS Example Measurable Objective

Transportation Infrastructure Improvement and Maintenance

Issue: The USFS transportation system is vulnerable to erosion if not properly maintained. Sediment mobilized from the road surface, transmitted through stream/road crossing or from road failures have the potential to adversely affect aquatic habitat, damage other infrastructure or mobilize mercury in the environment.

Measurable Objective: The USFS will develop a strategy for National Forests within the Willamette Basin that will help prioritize road restoration and maintenance based on analyses contained in the 2015 Road Investment Strategy. The strategy will prioritize roads that have the most potential to contribute sediment to riparian resources. This strategy, and the total miles of road identified for improvements, will be completed by 202X. USFS will report annually on percent of roads repaired/decommissioned/stored to date.

Agriculture Sector

ODA: TMDL Implementation Framework

- Regulatory
  - Agricultural Water Quality Area Rules

- Voluntary
  - Agricultural Water Quality Area Plans

Management Strategy: Example

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
Farm road construction: construct fords appropriately, install water bars or rolling dips to divert runoff to roadside ditches	Helps prevent sediment and mercury runoff to waters of the state	May help prevent water damage on farm roads	Cost of installation and maintenance

Focused Implementation

- Focus Areas
  - Soil and Water Conservation Districts

- Strategic Implementation Areas
  - ODA, SWCD, OWEB, DEQ, watershed partners

Examples: Measurable Objectives and Milestones

- Measurable Objective: Reduce sediment loading during irrigation season by 20% over the next ten years.
- Milestone: Reduce sediment loading by 10% by 2024.

- Measurable Objective: increase the average number of acres treated with upland conservation practices by 10% by 2028.
- Milestone: Show incremental, two percent increase every two years.

Responsible Persons: Water Conveyance Entities

- Entities that own and/ or operate water conveyance systems that have the potential to discharge to waters of the state (return flows)
  - Previously not included in WB Hg TMDL

- Central database of all potential water conveyance entities does not currently exist
  - Oregon Water Resources Department, Secretary of State, Soil and Water Conservation Districts, Oregon Water Resources Congress, Special District Association of Oregon

Responsible Persons: Water Conveyance Entities

- Many of the entities DEQ has identified may not operate systems that discharge to waters of the state (return flows).
- Some of these entities represent a collaborative of local water users, e.g. farmers, and do not have an organizational structure, do not collect user fees to support maintenance activities, and do not have a governing board.
- Some of these systems receive stormwater from other jurisdictions (city, county, road network) without the consent or approval of the water conveyance entity. Some of the water quantity and quality concerns are being driven by increasing stormwater loads from urban areas and road networks.

Water Conveyance Entities: WQ Management Strategy Examples

- Maintain a list of construction or ditch maintenance activities that require state and/ or federal permits or ODFW approval
- Implement streambank and/ or canal stabilization practices, including structural and non-structural best management practices
- Implement flow and drainage management to reduce erosion, and sediment delivery to streams

Dams

Implementation for Dam Operators

1. Assess factors affecting methylation rate in reservoirs
2. Evaluate approaches to reduce methylmercury production
3. Implement management strategy

Implementation for Dam Operators

1. Assess factors affecting methylation rate in reservoirs

   Goals

   - Establish baseline conditions
   - Evaluate and report on metrics consistent with other reservoirs

Implementation for Dam Operators

1. Assess factors affecting methylation rate in reservoirs

Example metrics

- Nutrient status
- Dissolved oxygen profile
- Average water level fluctuation
- Depth to surface area ratio
- Area of reservoir-adjacent wetland affected by water level fluctuations
- Summary of mercury sources
- Mercury translator ratio of THg to dMeHg in the water column

Implementation for Dam Operators

2. Evaluate approaches to reduce methylmercury production

Goals

- Identify management strategy for implementation
- Determine measureable objective

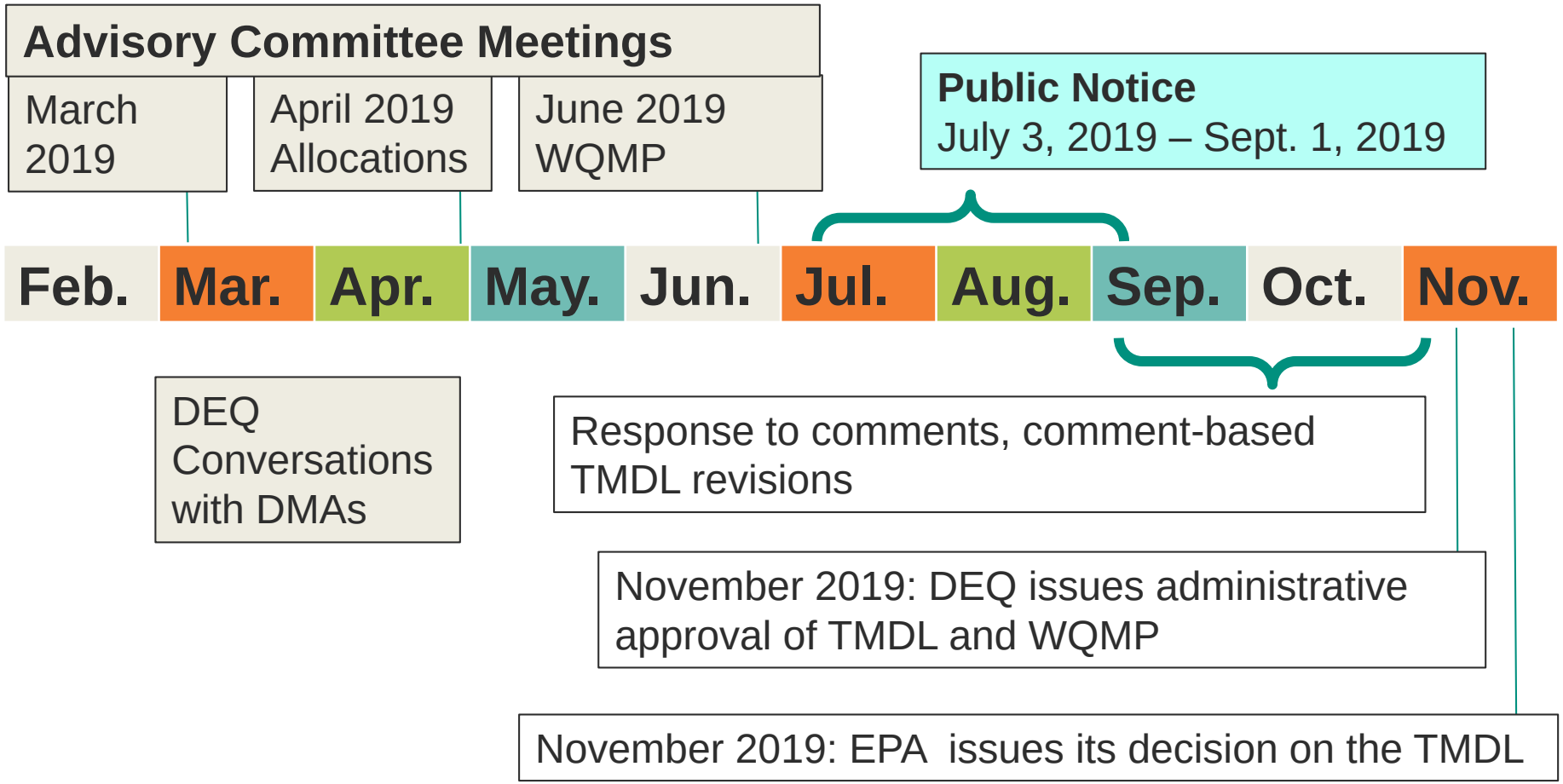
Implementation for Dam Operators

2. Evaluate approaches to reduce methylmercury production

Example approaches

- Oxidant addition to reservoir bottom waters
- Hypolimnetic oxygenation systems
- In-reservoir sediment removal or encapsulation
- Artificial circulation
- Reduction of average water level fluctuations
- Vegetation management
- Sediment amendment

Timeline


Advisory Committee Meetings
March 2019
April 2019 Allocations
June 2019 WQMP
Public Notice
July 3, 2019 – Sept. 1, 2019
Feb.
Mar.
Apr.
May.
Jun.
Jul.
Aug.
Sep.
Oct.
Nov.
DEQ Conversations with DMAs
Response to comments, comment-based TMDL revisions
November 2019: DEQ issues administrative approval of TMDL and WQMP
November 2019: EPA issues its decision on the TMDL

Next Steps

- Advisory committee meeting in June focused on implementation
  - What implementation related information or discussions would you like to address at the next meeting?
  - In-person or webinar meeting?
- Upcoming dates
  - June: Advisory Committee Meeting
  - July – August: Public Comment Period
  - November: EPA Decision