INTRODUCTION TO MODELING

WORKSHOP INTRODUCTION & OVERVIEW

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Background on Training

- Training requested by TCEQ
  - "Watershed coordinators have expressed a need for an introductory course covering the various models used for watershed modeling…an Introduction to Modeling training covering data needs for watershed characterization, cost estimates, presenting models to stakeholders and interaction with stakeholder groups."
- Clean Water Act, Section 319(h) Grant Funding provided by TSSWCB & EPA

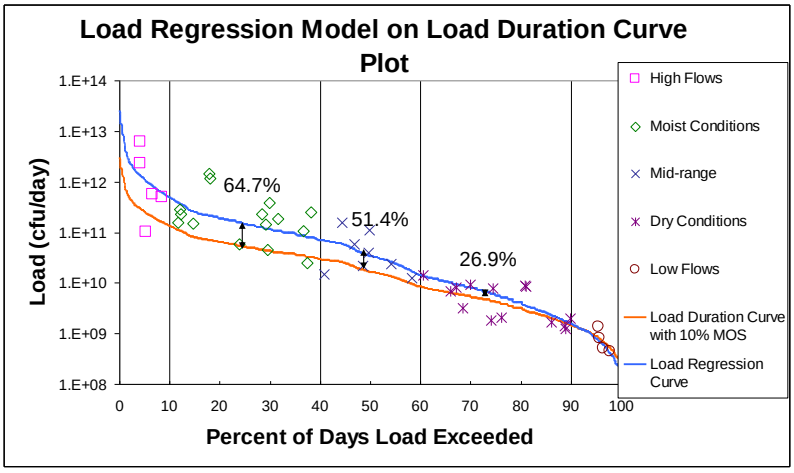
Role of Models in Watershed Planning

- Assess current loads
- Estimate load reductions needed
- Evaluate load reductions resulting from BMP implementation
  - Which BMPs are most effective?
  - How many of each BMP are needed?
- Target critical areas for implementation
- Develop appropriate milestones & assessment criteria
- Evaluate potential implementation impacts

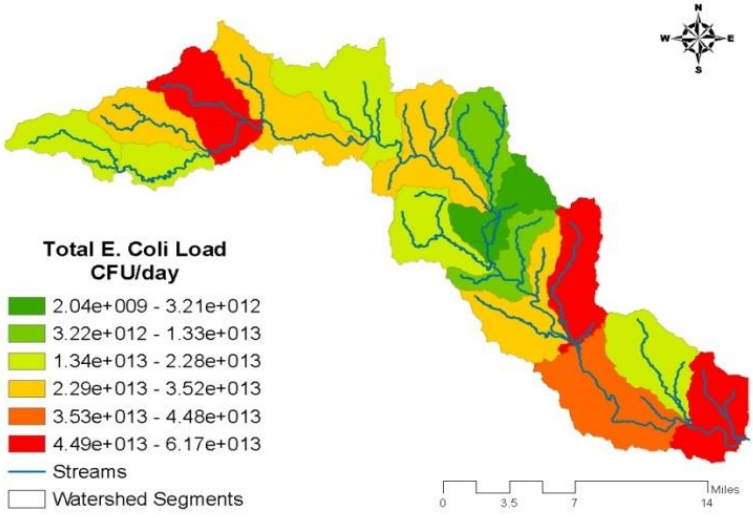
Model Utility

- Helps stakeholders better understand water quality and pollutant loading in watersheds through visualization
- Provides visual representation of:
  - Pollutant loads and needed loading reductions
  - Priority areas for BMP implementation
- Allows implementation scenarios to be evaluated before any actual implementation occurs
- Remember; models are useful but not necessarily right

Assess current loads & reductions



Target critical areas for BMPs



Effects of BMPs

Table 19. The individual effectiveness of BMPs at 100% adoption rate* as compared to the baseline model

BMPs	Area (ha)	Note	Reduction (%)		
			Sediment	Total N	Total P
1 Filter Strips	7,086	All Croplands	13.0	5.0	12.7
2 Grassed Waterway (10% Cropland)	1,418	Cropland Area in subbasins with more than 10% as cropland	3.8	0.2	3.1
3 Contour Farming	3,499	Cropland larger than 2% of slope	6.7	2.3	6.2
4 Terrace	3,499	Cropland larger than 2% of slope	7.1	2.5	6.8
5 Cropland Nutrient Management	7,086	All Croplands	0.0	-0.2	1.2
6 Cropland to Pasture	7,086	All Croplands	14.2	7.3	15.2
7 Prescribed Grazing	20,300	All Pasturelands	0.5	0.3	1.7
8 Pasture Planting	20,301	All Pasturelands	0.5	0.3	1.7
9 Critical Area Pasture Planting	77,125	Subbasin with more than 75% of Pastureland or Rangeland	1.8	4.6	1.5
10 2000 Ft Buffer	N/A		-4.6	0.7	5.1
11 Riparian Buffer	777	All Channels (Km)	29.4	2.4	3.3
12 Riparian Buffer in Critical Area	84	Channels in High Erosion Category (Km)	14.3	1.3	1.6
13 Graded Stabilization Structures	82,436	All Landuse (except Urban and Water) larger than 3% of slope	4.3	2.8	4.0
14 WWTP Level 2	N/A		0.0	-0.2	0.3
15 WWTP Level 3	N/A		0.0	0.3	0.6
16 Prescribed Burning	26,000	20% of total Rangeland	1.1	0.5	1.8
17 Aerial Herbicide	13,000	10% of total Rangeland	1.1	0.3	1.7
18 FP Sites (Ponds)	N/A	New Ponds in multiple subwatersheds	5.0	5.2	4.4

*Baseline: Sediment – 296,400 t/y, TN – 1,055,220 kg/y, and TP –173,020 kg/y

Importance of models to WPPs

- Many WPP elements supported by modeling
  - **A. Identification of causes & sources**
  - **B. Estimate of needed load reductions**
  - **C. Description of management measures**
  - D. Estimate of technical & financial assistance
  - E. Information/education component
  - F. Schedule for implementation
  - G. Description of interim, measurable milestones
  - **H. Criteria to determine if load reductions are achieved**
  - I. Monitoring component to evaluate effectiveness

Importance of models to TMDLs

- Problem Definition
- Endpoint Identification
- **Source Analysis**
- **Linkage Analysis**
- **Margin Of Safety**
- **Pollutant Load Allocation**
- Seasonal Variation
- Public Participation
- Implementation & Reasonable Assurances

Bacteria TMDL Task Force Report

Tier 1 Analysis (T1)

1. Form TMDL stakeholder advisory group.
2. **Develop comprehensive GIS inventory for watershed.**
3. Implement source survey for watershed.
4. **Calculate load duration curves (LDCs).**
5. Analyze Tier 1 data with stakeholder advisory group.

Tier 2 Analysis (T2)

1. Implement targeted monitoring to fill data gaps.
2. Perform library-independent BST and limited library-dependent BST analysis.
3. **Develop simple LDC, GIS and/or Mass Balance Models.**
4. Analyze Tier 2 data with stakeholder advisory group.

Tier 3 Analysis (T3)

1. Assure extensive stakeholder involvement.
2. Implement extensive targeted monitoring.
3. Perform extensive library-dependent BST analysis.
4. **Complete mechanistic modeling.**
5. Analyze Tier 3 data with stakeholder advisory group.

Goals of Workshop

- Review models & their purposes & limitations
- Provide guidance on hiring a contractor
- Discuss factors to consider when modeling
- Gain insight on developing modeling QAPPs
- Learn keys to successful communication with stakeholders

Workshop Overview

9:00 – 9:30 a.m.	**Intro & Overview**
9:30 – 11:45 a.m.	**Overview of Models**
12:30 – 1:00 p.m.	**Hiring a Contractor**
1:00 – 2:00 p.m.	**Factors to Consider**
2:00 – 2:45 a.m.	**Lit. values vs. monitoring**
3:00 – 4:00 p.m.	**QAPPs**
4:00 – 4:45 p.m.	**Stakeholder Communication**

Questions?

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