

# Loading capacity

How much is too much?

# What is needed

- Simple, clear statement
  - “The loading capacity for the Acme River is 30 lbs/day of phosphorus.”
  - If in a table, make sure the heading is clear
  - If using multiple tables, be clear on which numbers you want the EPA to approve
  - Use TMDL or Loading Capacity (LC), not “expected load, target load,” etc.
- Needs to meet WQS
- Need to explain how it was determined
- Need to explain what the critical condition is

# Determining Loading Capacity

## ■ Models

- There are no “approved” EPA models
- Each TMDL is a stand-alone document; don’t just reference another TMDL
- Explain why you chose your model
  - Cost, data needs can be factors
  - Explain how it meets the conditions of your TMDL
  - Summarize what and how your model works
  - Provide calibration/validation to show how well the model simulates the waterbody (also helps for MOS)
  - Provide a discussion of the strengths and weaknesses of the model

# Model examples

- Illinois – Big Muddy R, Homer Lake (P 84-85 of the Stage 1 report)
- Minnesota – Long Prairie, Otter Tail
- Ohio – Big Darby, Big Walnut (good model discussion, weak on why the model)
- Wisconsin – Sugar-Pecatonica (RUSLE2)

# Determining Load Capacity

## ■ Load Duration Curves

- Explain what this is, why this method was chosen and is appropriate – sometimes missing
- Make sure to include all the details
  - Which gages used, how many years of data, etc.
  - If not in the watershed, explain why the surrogate is acceptable
- Include strengths and weaknesses

# LDC Examples

- Minnesota: Regional Fecal (App. A)
- Indiana: Plummer Creek, Richland Creek
- Ohio: Lower Cuyahoga R



# Lake Macatawa, MI

## Loading Capacity

- To determine the loading capacity, MI used the Walker model
  - Listed several assumptions/uncertainties; i.e., Lake Mi intrusion, thermal wedging of cool Lake Mi water, etc
  - Given the target of 50  $\lambda$ g/L, model determined a LC of 55,000 lbs/yr (151 lbs/day)
- Point Sources: 4 majors, 44 minor
  - Current loads based upon design flow and permitted limit
- Nonpoint source load: used the Beale Ratio calculator
- Current Load - 138,000 lbs/yr (378 lbs/day)
  - point source load - 33,839 permitted (12,400 actual) lbs/yr (93 lbs/day)
  - nonpoint source load - 126,100 lbs/yr (346 lbs/day)

# Lake Macatwa Reductions

- TMDL = 55,000 lbs/yr (151 lbs/day)
- Current load = 138,000 lbs/yr (378 lbs/day)
- Note – if you use the current “real” load, 60% reduction is needed. However, using permitted loads, current load is 160,000 lbs/yr, and a 65% reduction.
- Moral of the story – we approve loads, not % reduction.



# Lake Macatawa Allocations

- **WLA = 20,000 lbs/yr (55 lbs/day)**
  - 19, 500 to 4 major permits
  - 500 to 40 minor permits (nowadays, prohibit this)
- **LA – 35,000 lbs/day ( 96 lbs/day)**

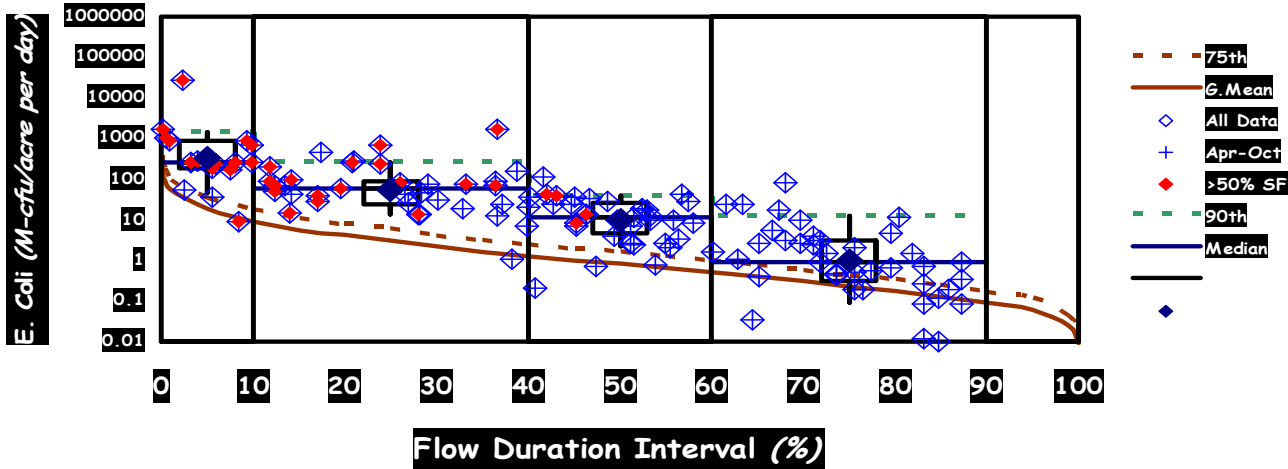
Facility	Annual WLA (lbs/yr)	Daily load (lbs/day)
Flint Ink-CDR-Holland	1,556	4.3
Holland WWTP	13,153	36
Mead Johnson & Co	1,141	3.1
Zeeland WWTP	3,650	10
All Other Facilities	500	1.4
<b>TOTAL</b>	<b>20,000</b>	<b>54.8</b>

# Critical condition

- Required in a TMDL 40 CFR 130.7(c)(1)
  - “Determinations of TMDLs shall take into account critical conditions for stream flow, loading, and water quality parameters.” (underline added)
- Does not equate to “high flow-low flow”
- When is the loading the greatest?
  - Storm events
  - Spring run-off
- There may not be a single flow condition that is critical – LDC often shows exceedences at many flows
  - If this is true, then make sure to explain it

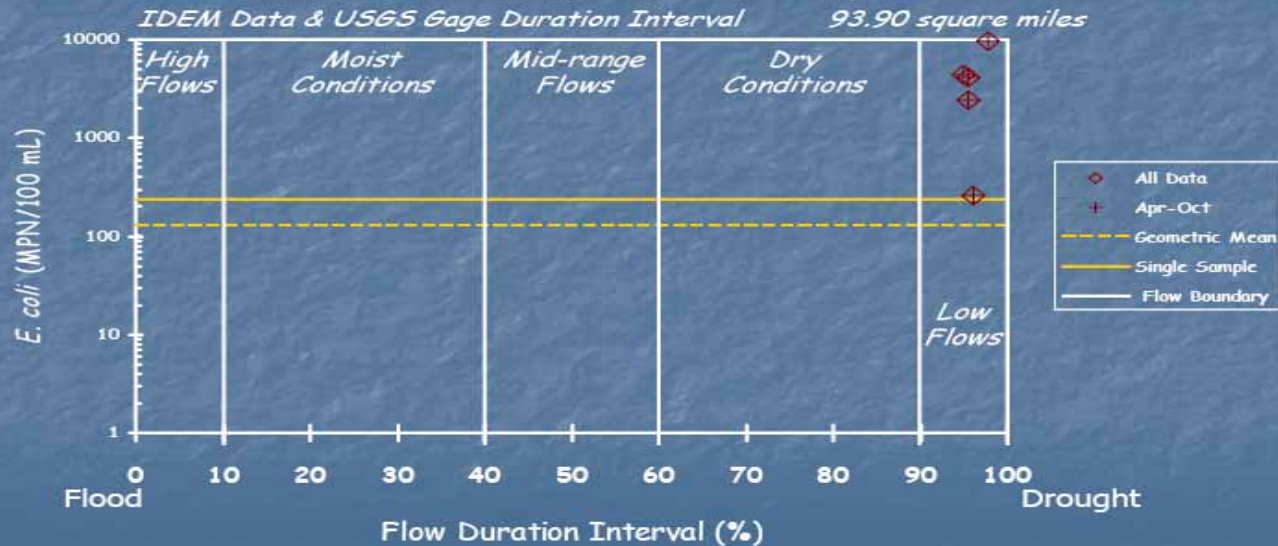
# LDC examples

**St Mary's R TMDL**



**Little Sugar Creek CR 350N**

**Water Quality Duration Curve (2002 Monitoring Data)  
Site 11 (WED080-0014)**



# Daily does not mean only 1 number

- You can have a daily number only
- You can have a daily number based upon the months
  - May = 5 lb/d, June = 4 lbs/day, July = 3 lbs/day
- You can have a daily number based upon the seasons
  - spring = 10 lb/d, summer = 8 lb/d
- You can have 2 daily numbers
  - Daily average = 5 lb/d
  - Daily max = 9 lb/day

# NOW, where are we at?

- ✓ Watershed described
- ✓ Pollutant and impairment ID'ed
- ✓ WQS ID'ed
- ✓ Target ID'ed

Now we have;

- ✓ the loading capacity determined and justified
- ✓ Critical condition determined and justified  
(Parts 1, 2 and 3 of the approval template)