

# **Waterway Analysis Model Batch Processing Program - WAM BPP**

## ***Lock Capacity Analysis***

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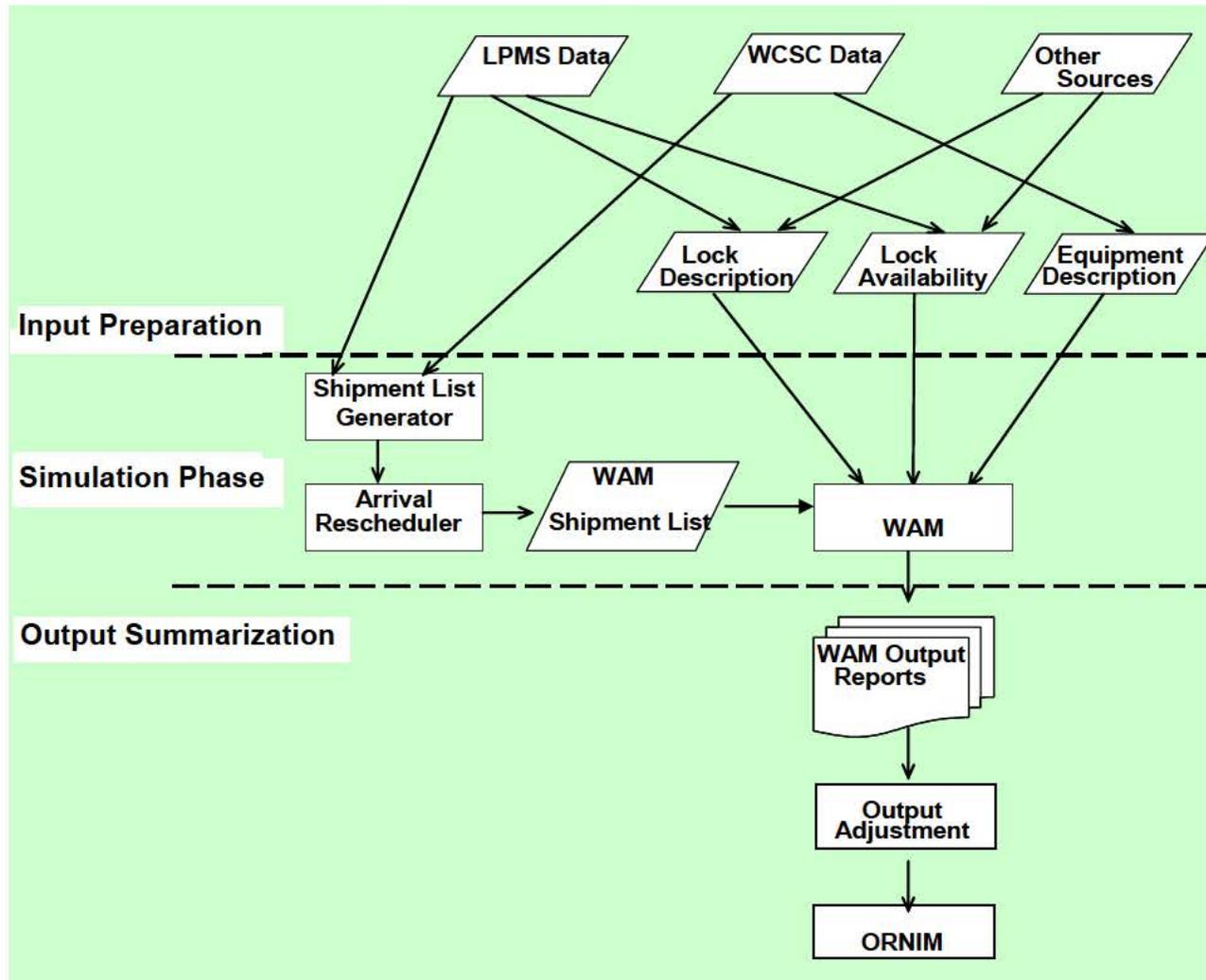
**USACE Navigation Planning Center of  
Expertise**

**Huntington District**

# Waterway Analysis Model – WAM

- **WAM is a Simulation Model developed by the Corps to determine the impact of tow movements on the inland waterway system**
  - *simulates tow (towboat plus barges) movements through navigation locks based on the model configuration.*
- **4 Major Components of WAM**
  - **System Description Input Data** – waterway network, tow fleet, cargo
  - **External Event Input Data** – tow arrivals, lock downtimes
  - **Simulation Program** - processes tows through the waterway network from origin to destination (O-D pairs) ports.
  - **WAM Model Output** - detailed lock database tables

# Waterway Analysis Model Process Overview



# Waterway Analysis Model (WAM)

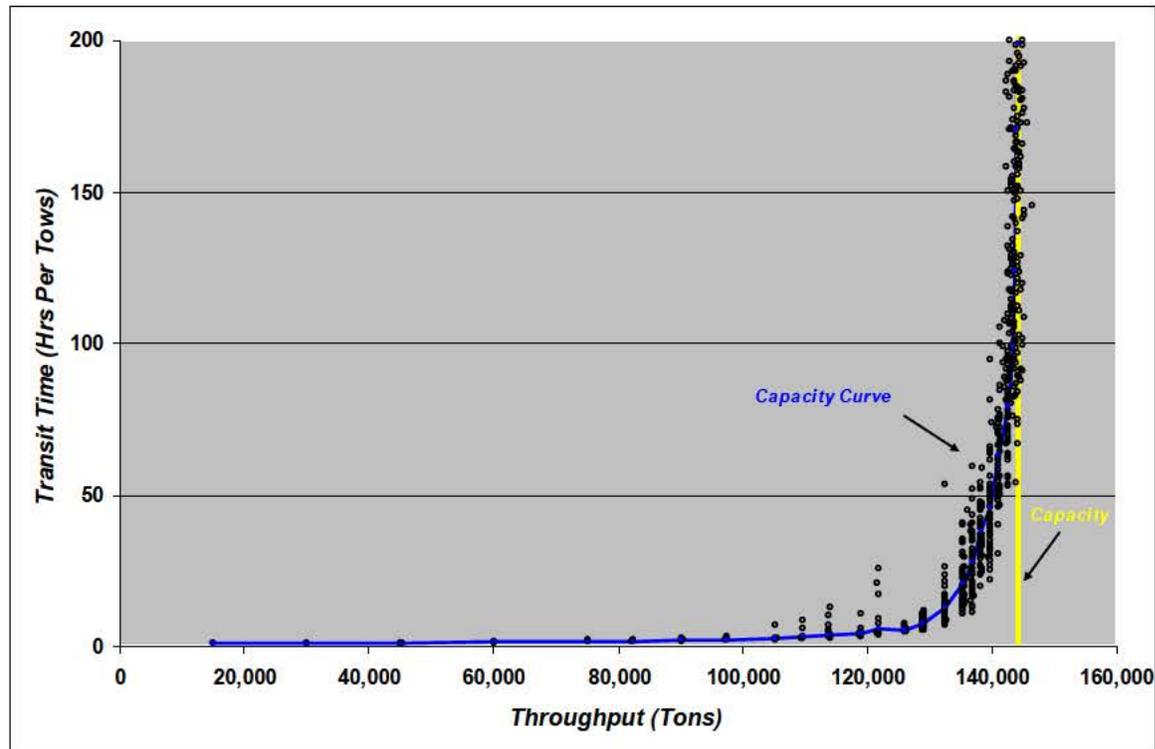
## Lock Capacity Analysis

- Purpose of WAM is to create Lock Capacity Curves.
- Capacity Analysis - relationship between traffic demand (tonnage) and expected tow transit times (delay + processing times).
- Transit time includes the time the vessel is “delayed” and the time needed to “process” the vessel through the lock.
- Tow arrives at a lock & either “waits” (facility is busy) or is “processed” (moves tonnage) through a lock chamber.
- During chamber downtimes, vessels must either use another chamber or wait until the downtime ends - causing increased processing times and high delays at the lock projects.

# Lock Capacity Curve

## One Set of WAM Runs

(average of 50 runs at 27 different traffic levels)



# Family of Curves –

## *Lock Chamber Downtimes & Closure Events*

- **Family of Curves - collection of 26 curves created using lock chamber downtimes & unique long closure events**
- **Two Types of Closure Events**
  1. **Random Minor Stalls (unscheduled events < 1 day)**
    - **Full OP Curve – Main & Auxiliary Chambers Open**
  2. **Long Closures (scheduled or unscheduled events > 1 day)**
    - **Main or Auxiliary Chambers Closed due to Major Maintenance or Rehabilitation Events**
    - **Family of Curves (1, 3, 5, 10, 15, 30, 45, 60, 90, 180, & 365 Day Closures)**
    - **Queue Limits & Half Speeds (30, 45, 60, & 90 Day Closures)**



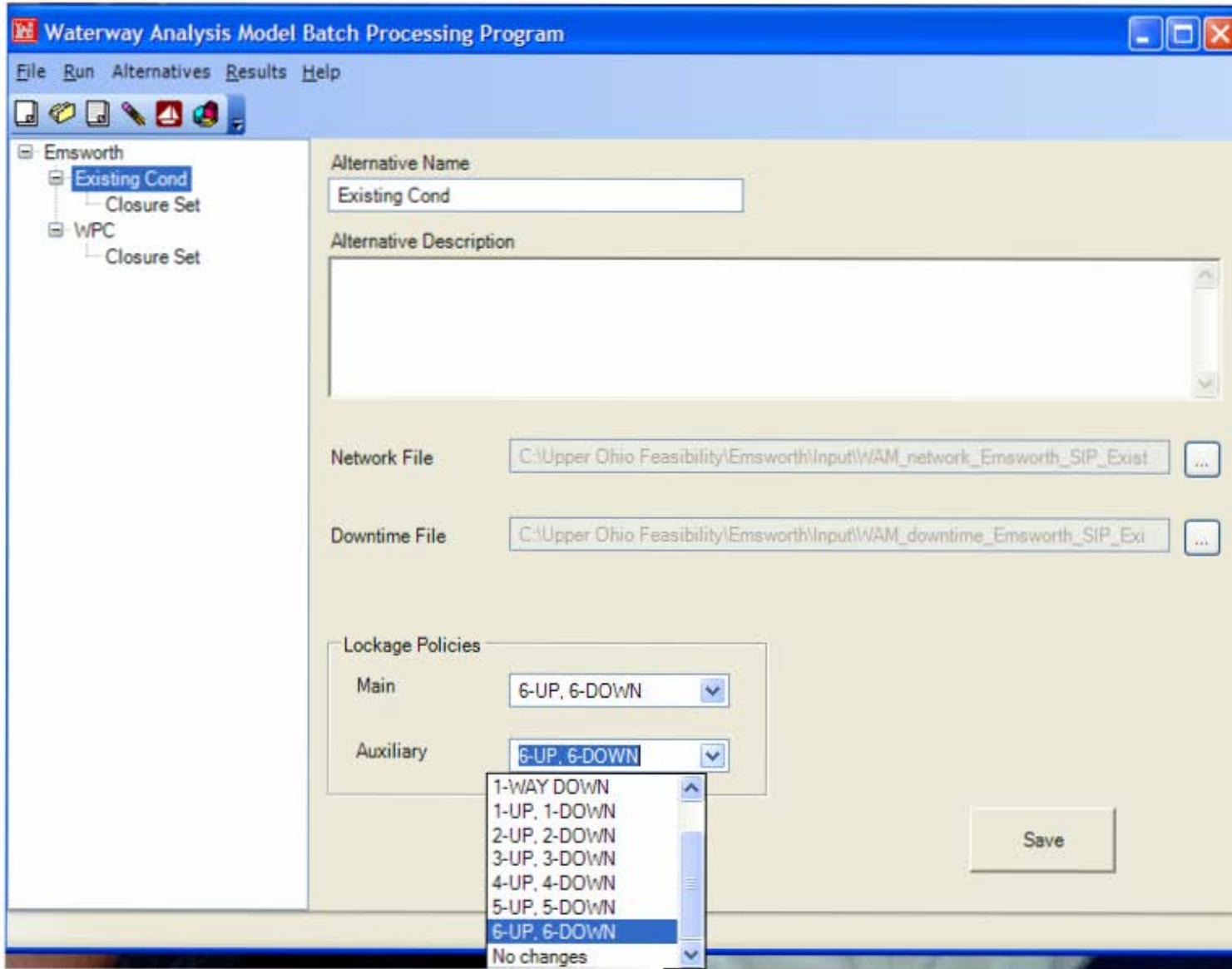
# **Waterway Analysis Model Batch Processing Program - WAM BPP**

## **WAM BPP was developed to:**

- **Eliminate the process of creating separate Downtime & Startup files**
- **Modify Input Files before a WAM Run**
- **Specify and save all the Parameters to define a WAM Run**
- **Execute several programs to make the WAM Run**
- **Read and Write to and from ASCII text files**
- **Store the Output Results in Access Database Tables**

# WAM BPP

## Project Alternatives



# WAM BPP

## Lock Closure Scenarios

Waterway Analysis Model Batch Processing Program

File Run Alternatives Results Help

Emsworth

- Existing Cond
  - Closure Set
- WPC
  - Closure Set

Closure Sets					
Chamber	StartTime	Downtime	Type	UseQueueLimits	
▶ 1	90	1	Unscheduled	<input type="checkbox"/>	
1	90	3	Unscheduled	<input type="checkbox"/>	
1	90	5	Unscheduled	<input type="checkbox"/>	
1	90	10	Unscheduled	<input type="checkbox"/>	
1	90	15	Unscheduled	<input type="checkbox"/>	
1	90	30	Scheduled	<input checked="" type="checkbox"/>	
1	90	45	Scheduled	<input checked="" type="checkbox"/>	
1	90	60	Scheduled	<input checked="" type="checkbox"/>	
1	90	90	Scheduled	<input checked="" type="checkbox"/>	
1	90	180	Unscheduled	<input type="checkbox"/>	
1	0	365	Unscheduled	<input type="checkbox"/>	
1	90	30	Slowdown	<input type="checkbox"/>	
1	90	45	Slowdown	<input type="checkbox"/>	
1	90	90	Slowdown	<input type="checkbox"/>	
2	90	15	Unscheduled	<input type="checkbox"/>	
2	90	30	Scheduled	<input checked="" type="checkbox"/>	

Add Row Set Queue Limit Options

# Waterway Analysis Model Batch Processing Program - WAM BPP

**Waterway Analysis Model Batch Processing Program**

File Run Alternatives Results Help

Emsworth

- Existing Cond
  - Closure Set
- WPC
  - Closure Set

Name: Emsworth

Description:

**WAM Settings**

Number of Runs: 50

Number of Points: 27

Maximum Tow Delay: 200

Delay Confidence: 0

**Shipment Generator Settings**

Traffic Escalator: 100

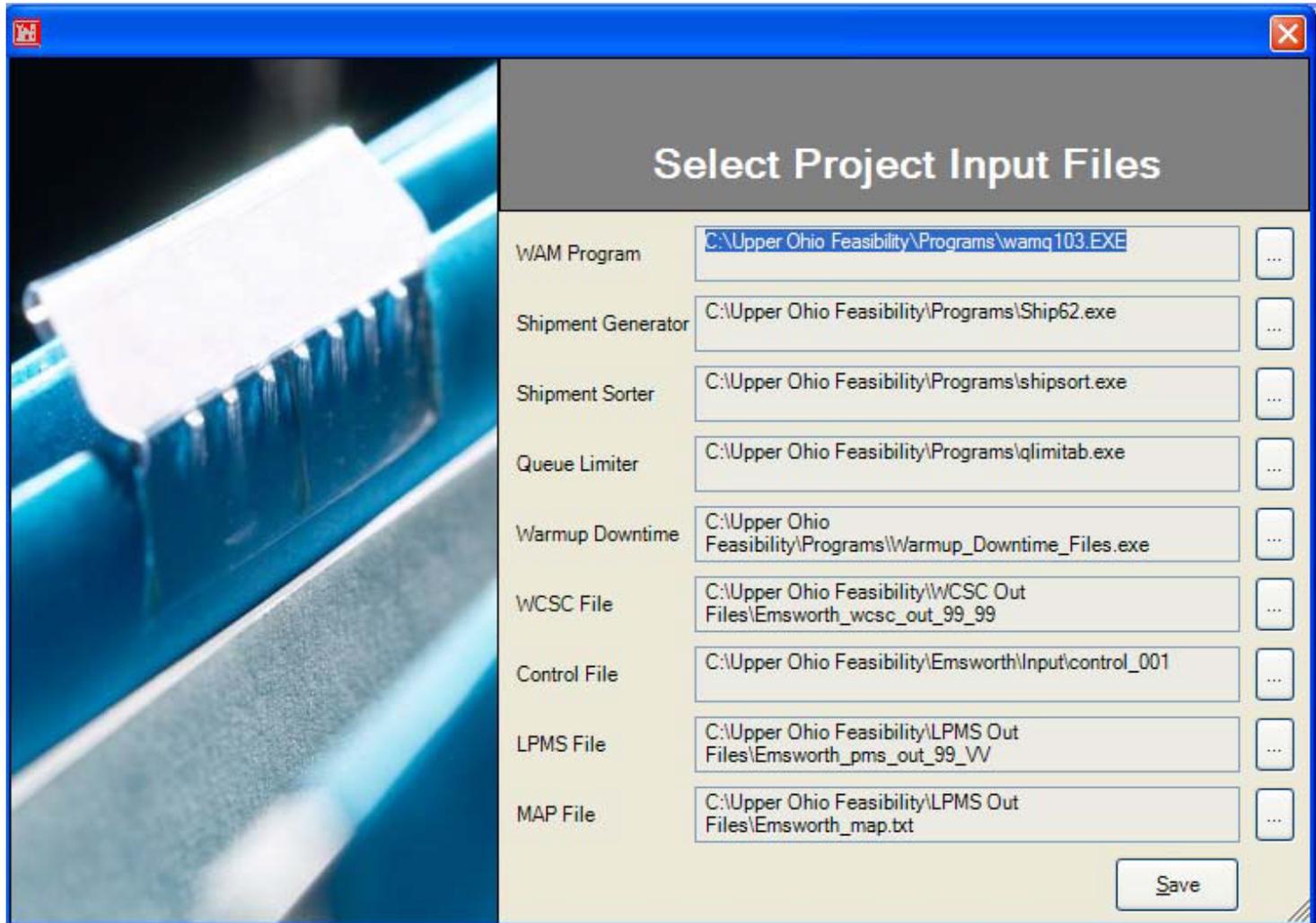
Warmup (in days): 30

Output Directory: C:\Upper Ohio Feasibility\Emsworth\Output

Random Number Seed: 1000 [Reset]

[Archive Options] [Select Input Files]

# WAM BPP - Executable Programs



# Waterway Analysis Model Batch Processing Program - WAM BPP

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**Questions ???**