Waterway Analysis Model Batch Processing Program - WAM BPP

Lock Capacity Analysis

Sharon Weekley

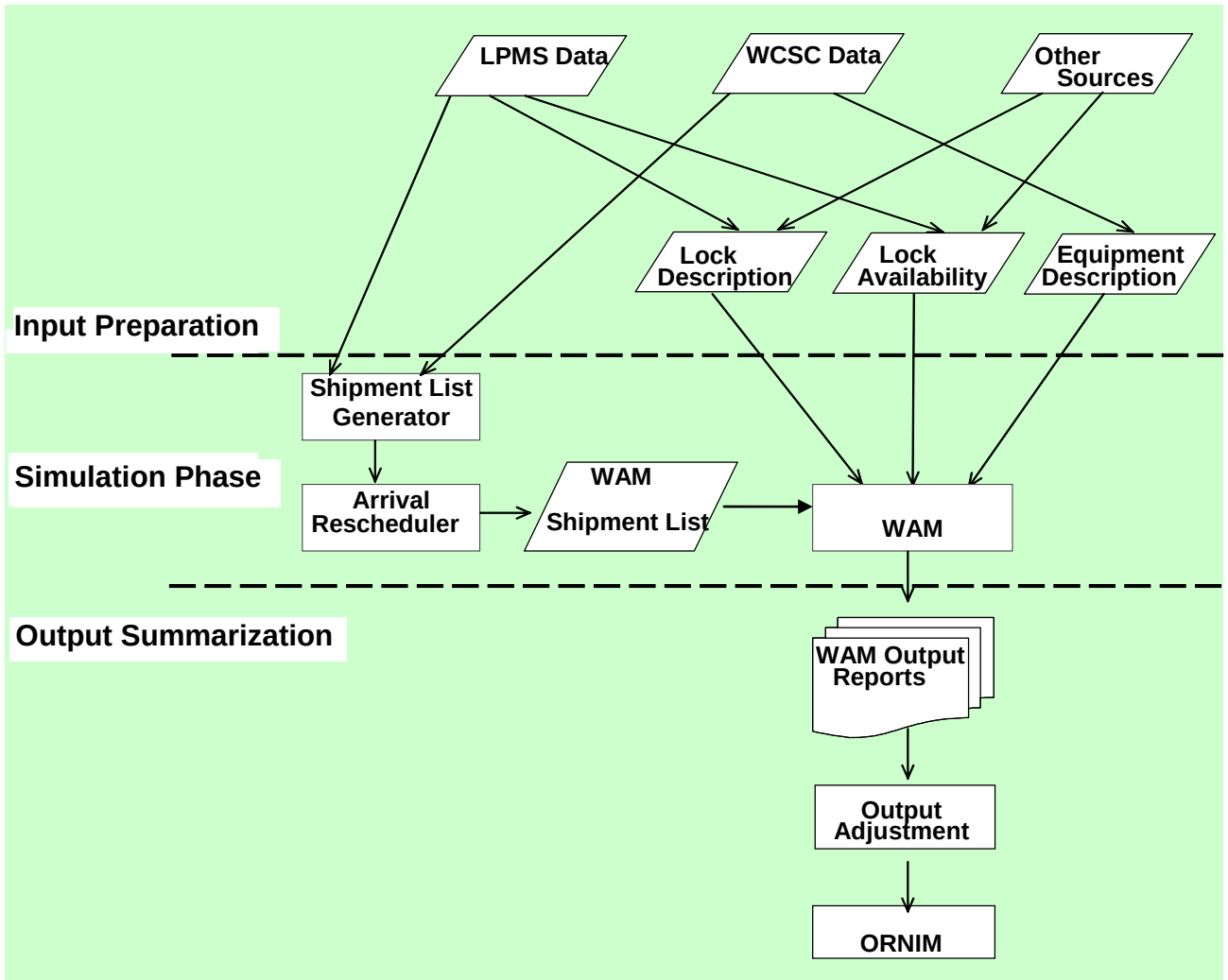
USACE Navigation Planning Center of Expertise

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.**

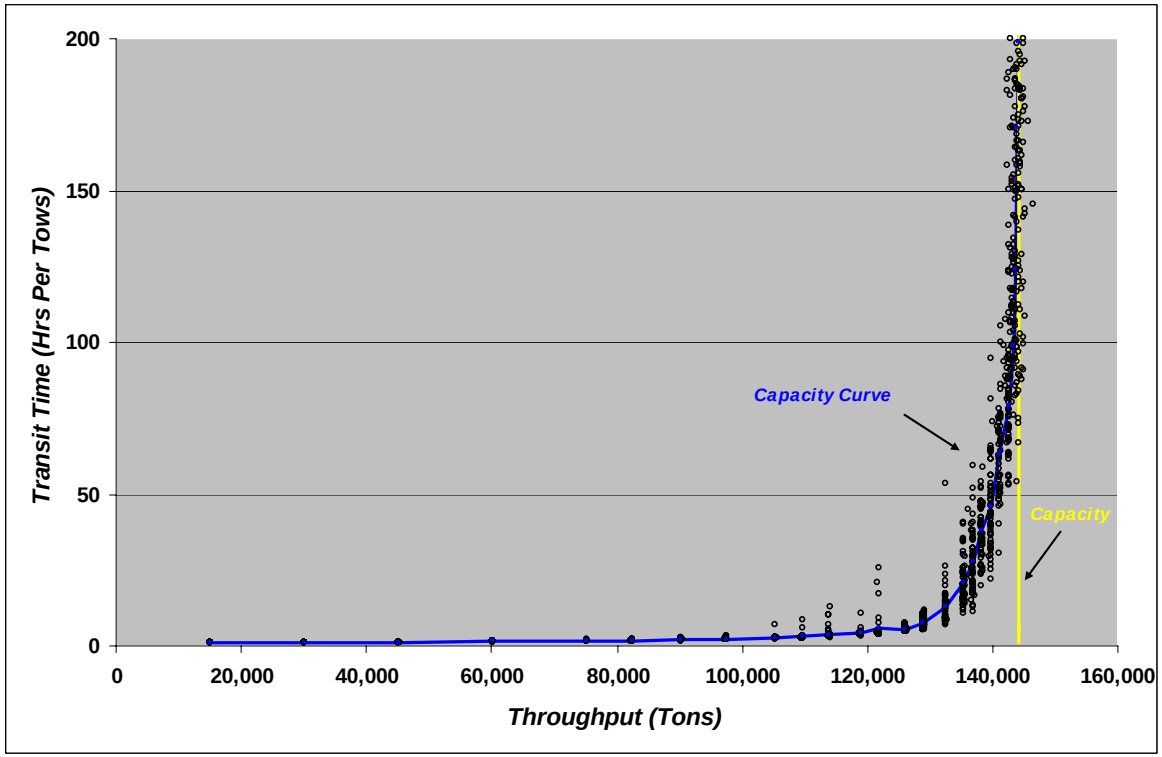
- **Capacity Analysis - relationship between traffic demand (tonnage) and expected tow transit times (delay + processing times).**

- **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***

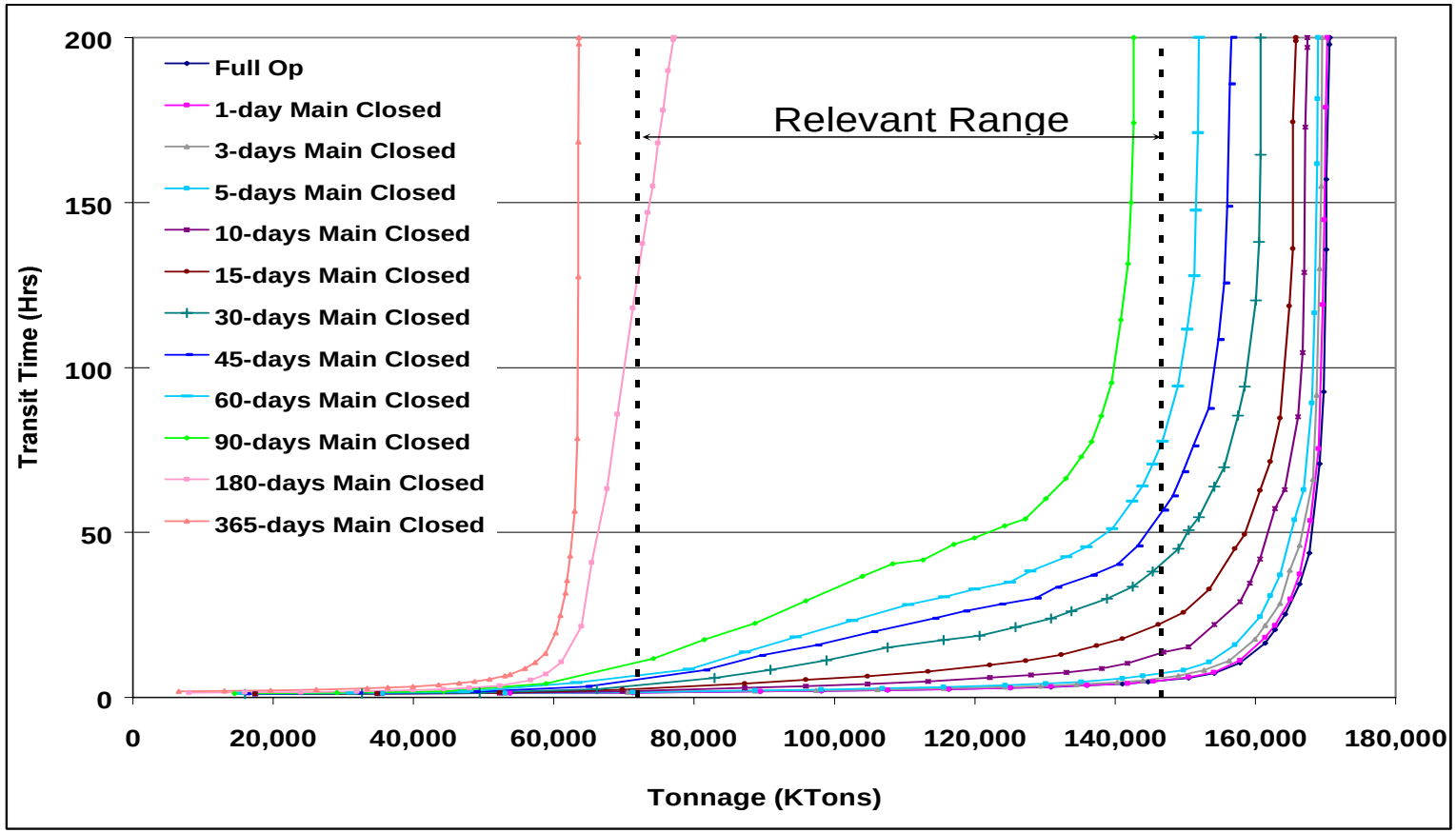
- **Two Types of Closure Events**

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)***

Lock Capacity Analysis
Typical Family of Curves

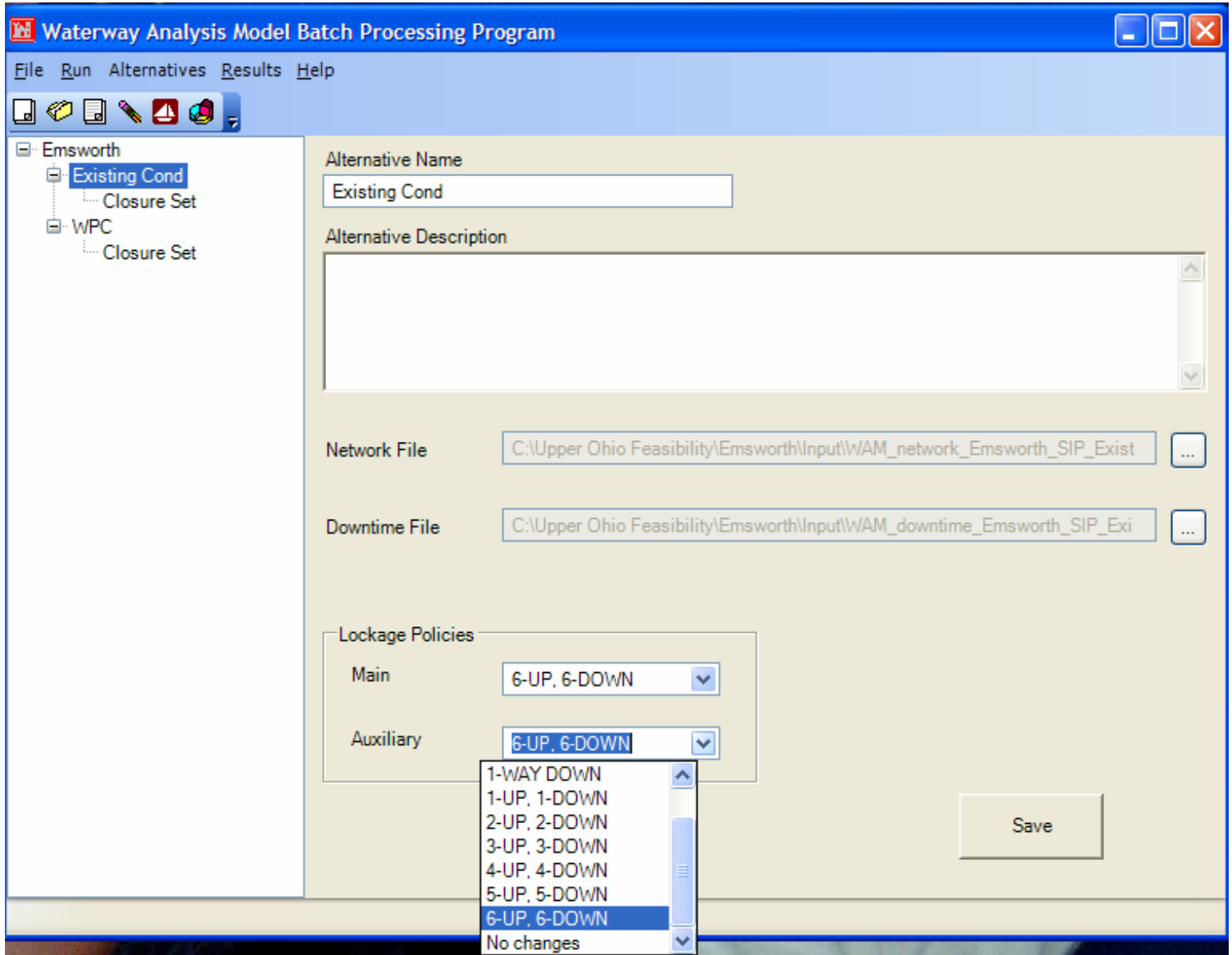


Waterway Analysis Model
Batch Processing Program - WAM BPP

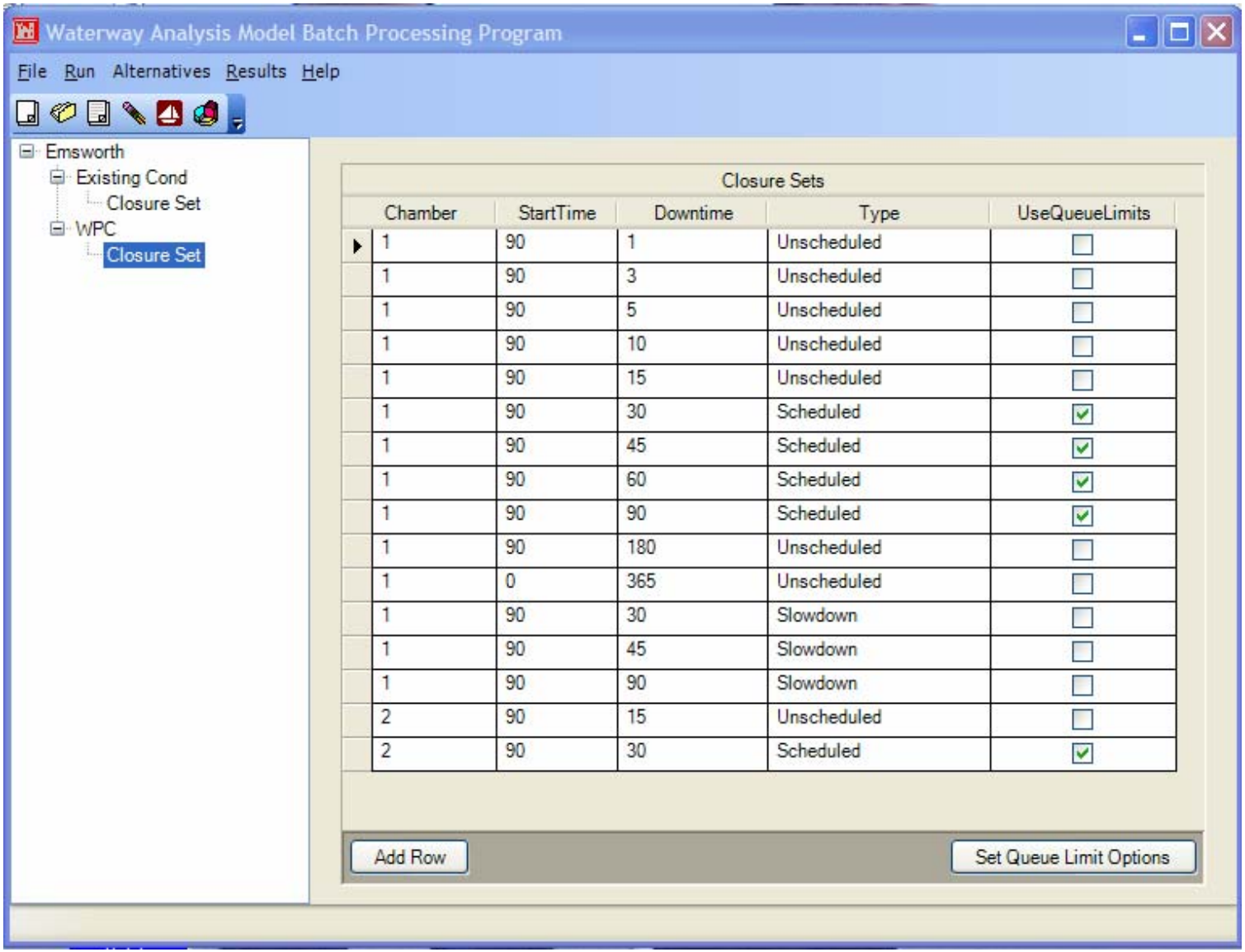
WAM BPP was developed to:

- 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

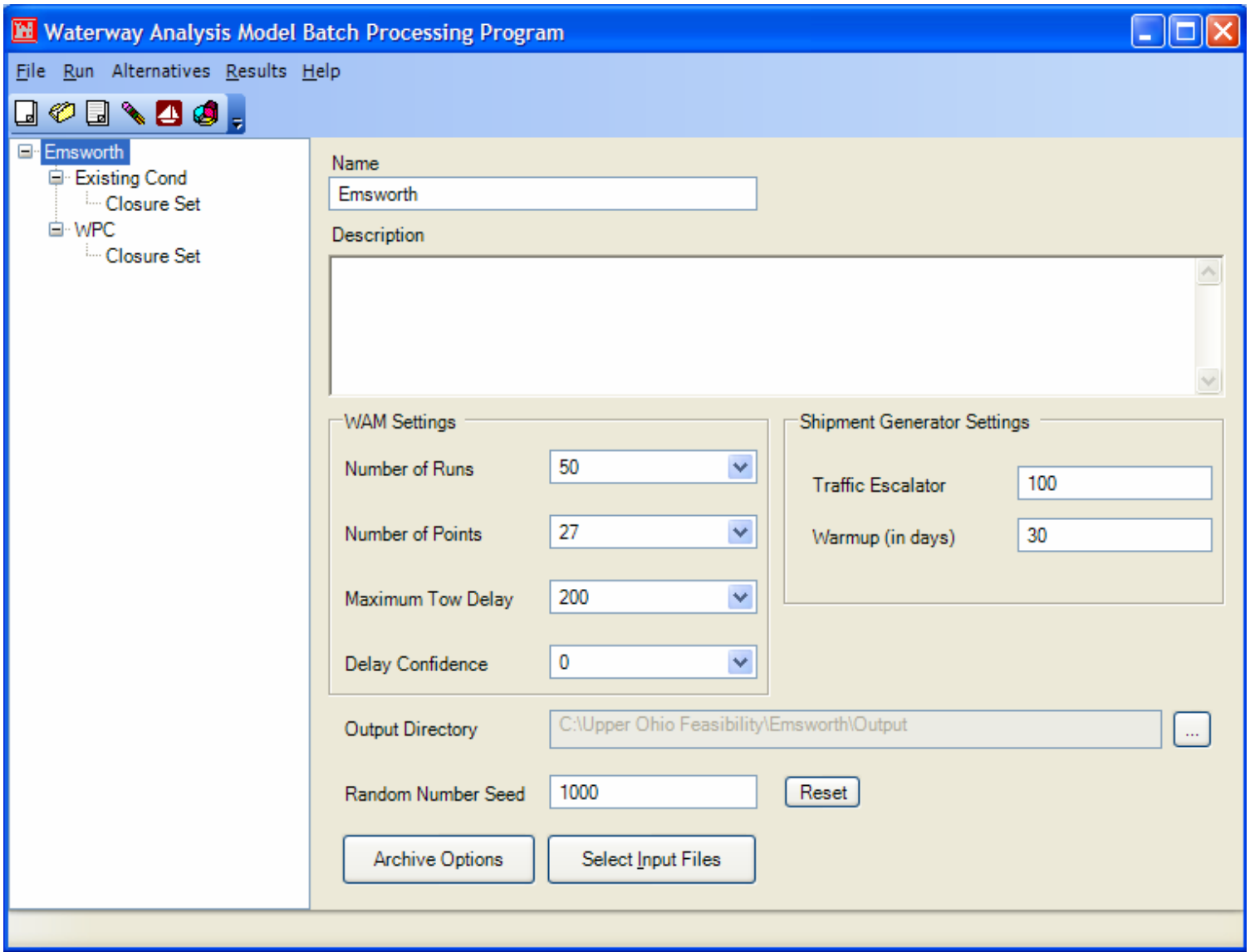
WAM BPP
Project Alternatives



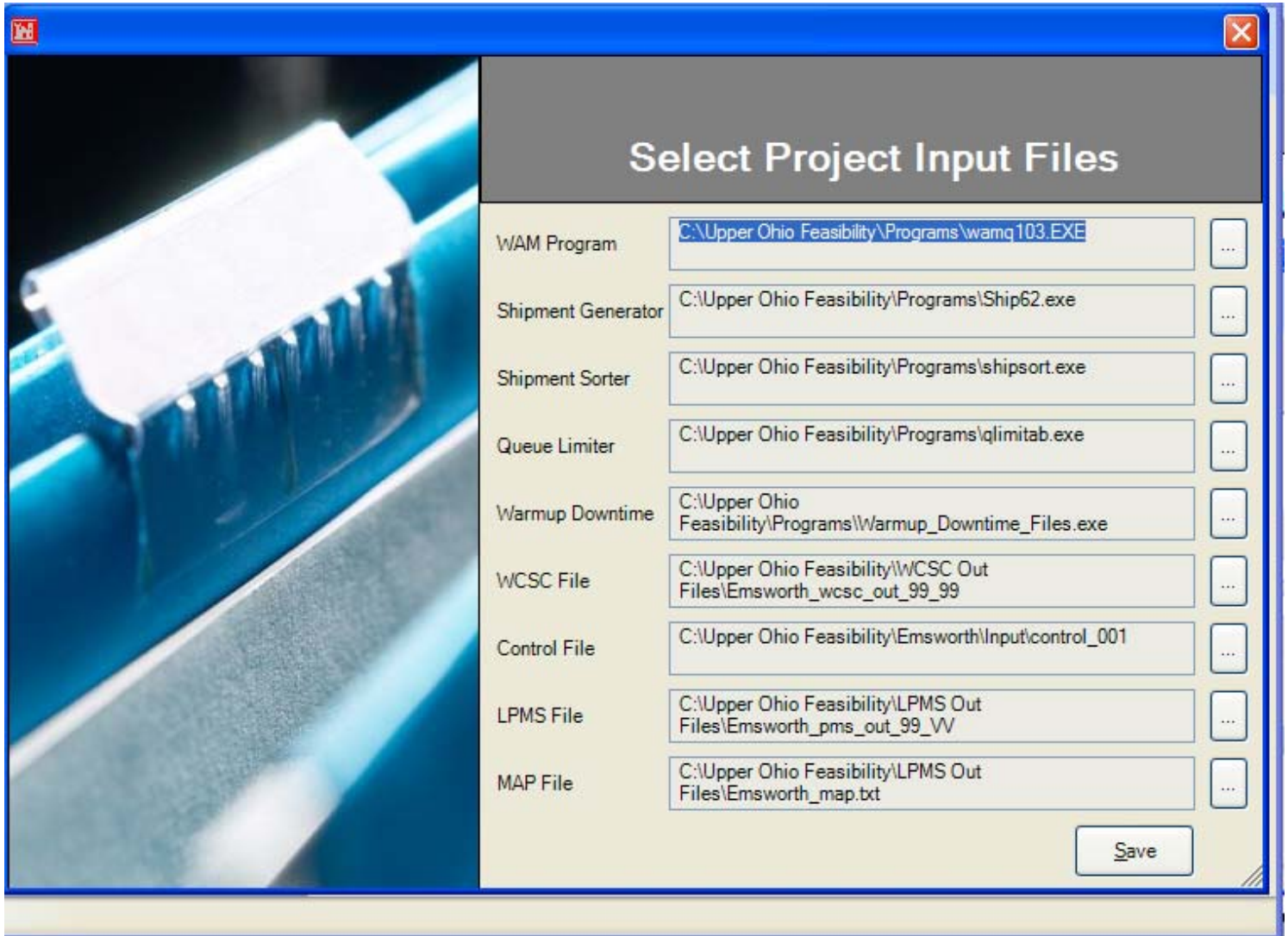
WAM BPP
Lock Closure Scenarios



Waterway Analysis Model Batch Processing Program - WAM BPP



WAM BPP - Executable Programs



Waterway Analysis Model
Batch Processing Program - WAM BPP

Questions ???