

Introductions

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Presentation Overview

- General Introduction to the Model
- Modeling Approach
- How the Model Works
- Web site Preview

Facet Decision Systems, Inc.

- We are:
 - A 14 year old MacDonald Dettwiler spin-off
 - Vancouver based private company
- We sell scenario-based decision support:
 - Software
 - Consulting services
 - Complete solutions
- We sell to:
 - Governments – federal, state/provincial and local
 - Divisions of Fortune 1000 corporations
- We integrate all decision-making components:
 - Information (assemble & clean)
 - Models (integrate & manage)
 - People (communicate & decide)

Water Credentials

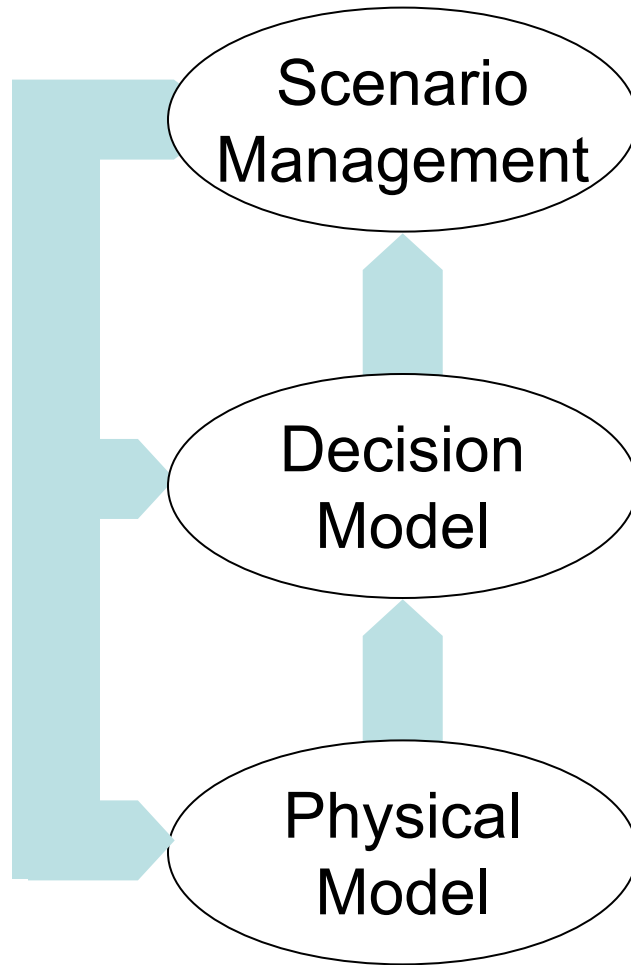
- Fraser Basin Model
- Upper Snake River Basin Model
- Watersheds
- Idaho National Laboratory Model
- HydroBasin

General Introduction to the Model

Objectives

- Represent how water is currently stored, routed, and used in generation in the Big Creek system.
- Represent water use in a manner that reflects current operations and capacities
- Allow “What IF” questions to be evaluated about flow releases and storage
- Provide results in terms of flows, storage, and generation

HydroBasin Architecture



- Assumptions/Parameters
- Reports
- Data Sets
- Website

– Constraint Pass/Fail

- Time
- Water Flows
- Water Storage

Physical Model Configuration

Current Configuration

- Mass balancing model – mimics processes
- Models water flow & storage
- Weekly time steps over one year
- Daily flow constraints
- Includes MPOA, etc.

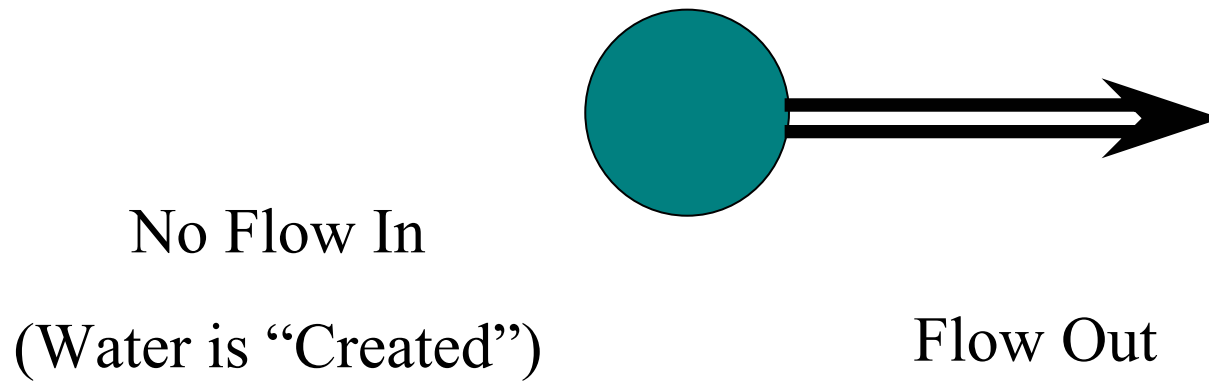
Issues with Modeling

Models don't predict the future, but they can help us understand the choices we face

Model Overview

- Inflows
- Diversions
- Reaches
- Water Conveyances
- Reservoirs
- Powerhouses
- Outflow

Inflows



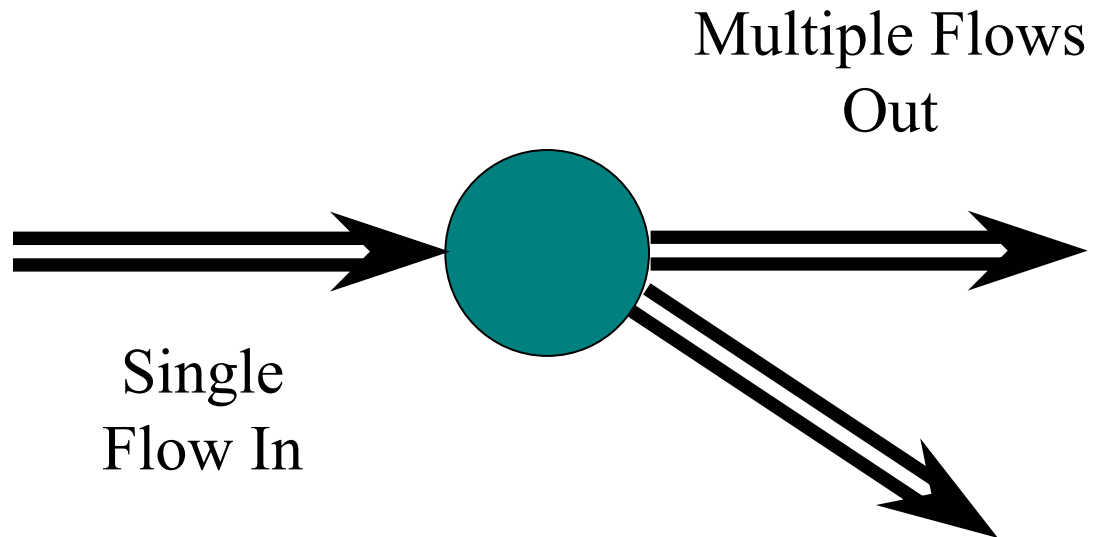
Inflow List

- Balsam Diversion Dam Inflow
- Balsam Forebay Inflow
- Bear Creek Inflow
- Bolsillo Creek Inflow
- Camp 62 Creek Inflow
- Chinquapin Creek Inflow
- Crater Creek Inflow
- Dam 4 Inflow
- Dam 5 Inflow
- Dam 6 Inflow
- Edison Lake Inflow
- Ely Creek Inflow
- Florence Lake Inflow
- Hooper Creek Inflow
- Huntington Lake Inflow
- Mammoth Pool Inflow
- North Slide Creek Inflow
- Pitman Creek Inflow
- Portal Forebay Inflow
- Redinger Lake Inflow
- Rock Creek Inflow
- Ross Creek Inflow
- Shaver Lake Inflow
- South Slide Creek Inflow
- NF Stevenson Creek Inflow
- Tombstone Creek Inflow
- Warm Creek Inflow

Inflows

- Water-Year based (Wet, AN, Dry, Critical)
- 52 - weeks starting October 1
(doesn't include December 31 or February 29)
- Based on water balanced unimpaired flows
- Inflows allocated to un-gaged basins
- Weekly time step

Diversions



Diversion List

- Dam 4
- Dam 5
- Dam 6
- Portal Forebay
- Balsam Creek Diversion Dam
- Bear Creek Diversion Dam
- Bolsillo Creek Diversion Dam
- Camp 62 Creek Diversion Dam
- Chinquapin Creek Diversion Dam
- Crater Creek Diversion Dam
- Ely Creek Diversion Dam
- Hooper Creek Diversion Dam
- Mono Creek Diversion Dam
- North Slide Creek Diversion Dam
- Pitman Creek Diversion Dam
- Rock Creek Diversion Dam
- Ross Creek Diversion Dam
- South Slide Creek Diversion Dam
- North Fork Stevenson Creek Tunnel 2 Outlet
- Tombstone Creek Diversion Dam
- Warm Creek Diversion Dam

Diversions

- Route water from streams to conveyances
- Reservoirs are modeled like diversions except that they are used to store water

We Model Diversions by:

- 1 or more streams into the diversion
- 1 or more conveyances
- We put exactly the minimum instream flow out for all dates – this doesn't always match actual operational patterns (e.g., no over releases for MIFs).

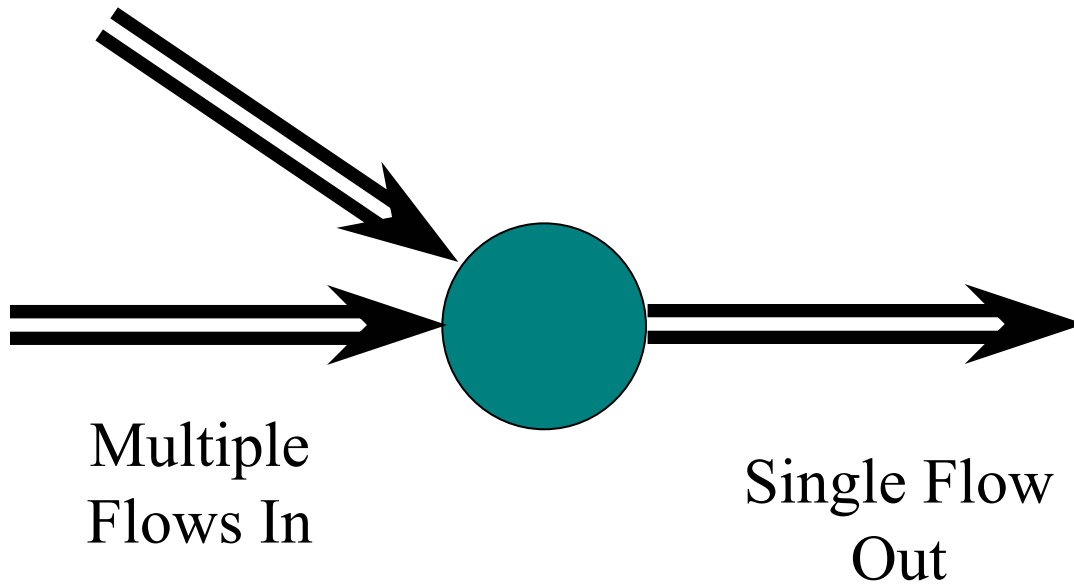
Water Conveyances

- Move water from reservoirs or diversions to a generator
 - Conduits
 - Tunnels
 - Streambeds

Water Conveyance List

- Balsam Conveyance
- Bear Conveyance
- Bolsillo Conveyance
- Camp 62 Creek Conveyance
- Chinquapin Creek Conveyance
- Crater Creek Conveyance
- Dam 4 Conveyance
- Ely Creek Conveyance
- HB Valve Below Portal Spill Conveyance
- Lower Hooper Conveyance
- Upper Hooper Conveyance
- HPS Conduit Above Balsam
- HPS Conduit Above Gate 2
- HPS Conduit Below Huntington
- Mono Bear Siphon
- Mono Conveyance
- North Slide Conveyance
- Pitman Conveyance
- Rock Conveyance
- Ross Conveyance
- South Slide Creek Conveyance
- Tombstone Creek Conveyance
- Upper Mammoth Tunnel
- Ward Tunnel Above Portal Forebay
- Ward Tunnel Below Florence Lake
- Ward Tunnel Below Portal Forebay
- Warm Creek Conveyance

Confluences



Reaches

- Paths of natural stream flow
- HydroBasin rules model flow constraints (e.g.: License required minimum instream flows, user added releases to be “gamed”)

Reach List

- Balsam Creek below Balsam diversion dam
- Balsam Breek below Balsam Forebay
- Balsam Ely Big Creek junction overflow
- Bear Creek
- Big Creek above Dam 5
- Big Creek Below Dam 4
- Big Creek Below Dam 5
- Big Creek Below Huntington
- Boggy Creek
- Bolsillo Creek
- Camp 61 Creek below Portal Forebay
- Camp 62 Creek
- Camp 62 Junction Overflow
- Chinquapin Creek
- Crater Creek
- Ely Creek
- Hooper Creek
- Mono Creek Below Diversion
- Mono Creek Below Edison
- North Slide Creek
- Pitman Creek
- Rock Creek
- Ross Creek
- South Fork San Joaquin River Above Gauge
- South Fork San Joaquin River Below Gauge
- San Joaquin River Above Dam 6
- San Joaquin RiverAbove Mammoth Pool
- San Joaquin River Above Redinger Lake
- San Joaquin River Below Dam 6
- San Joaquin River Below Mammoth Pool
- San Joaquin River Below Redinger Lake
- South Slide Creek
- NF Stevenson Creek Above Gate 2
- NF Stevenson Creek above Shaver Lake
- Stevenson Creek below Shaver Lake
- Tombstone Creek
- Warm Creek

Reservoirs Store Water

Natural Inflow



Reach

Generation

Conveyance

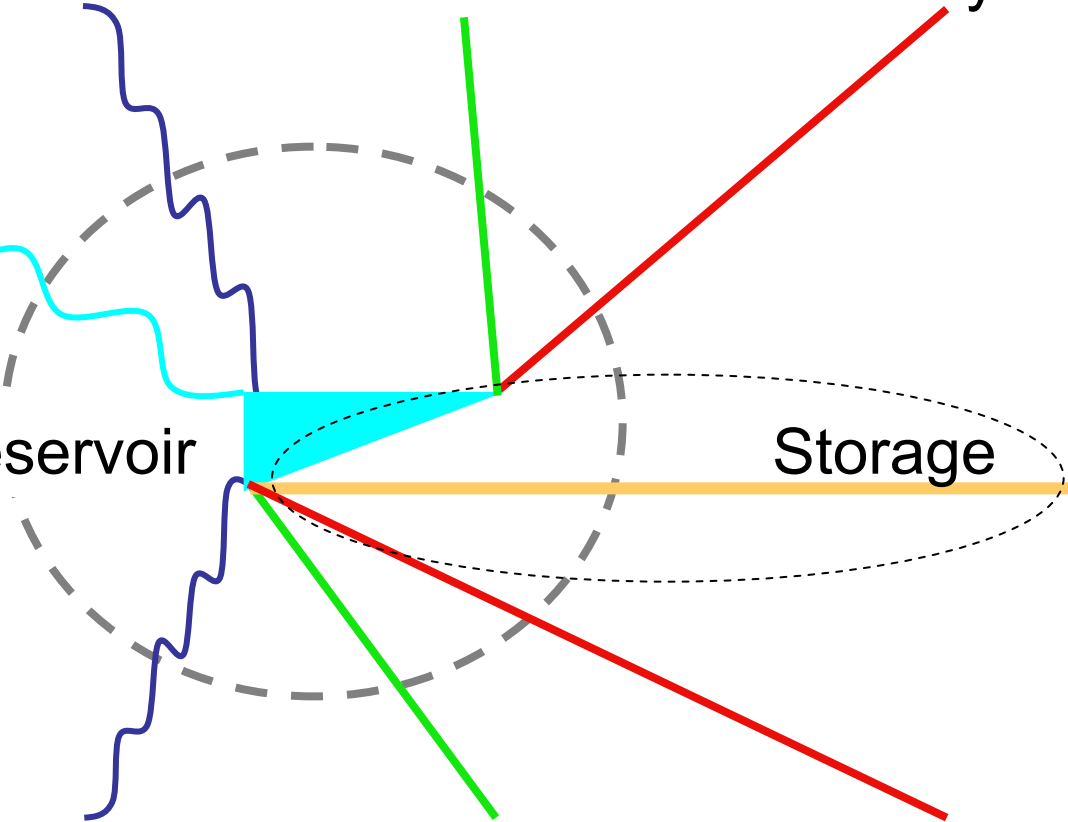
Reservoir

Storage

Reach

Power Generation

Water Conveyance



Reservoir List

- Florence Lake
- Edison Lake
- Huntington Lake
- Shaver Lake
- Mammoth Pool
- Redinger Lake

Reservoirs

- Implemented in weekly time-steps
- Water is allocated by priority until no more water is available
- Storage constraints may take priority over other uses (minimum winter pool at Florence Lake)
- Unallocated water is stored for the next time-step
- Stored water $>$ than capacity is spilled

Powerhouses

- Modeled as weekly flow through a powerhouse

Powerhouse List

- Big Creek Powerhouse 1
- Big Creek Powerhouse 2
- Big Creek Powerhouse 2A
- Big Creek Powerhouse 3
- Big Creek Powerhouse 4
- Big Creek Powerhouse 8
- Portal Power Plant
- Mammoth Pool Powerhouse
- Eastwood Power Station