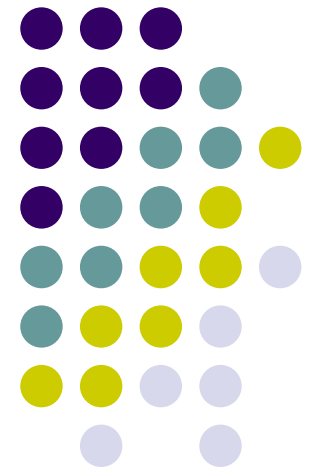
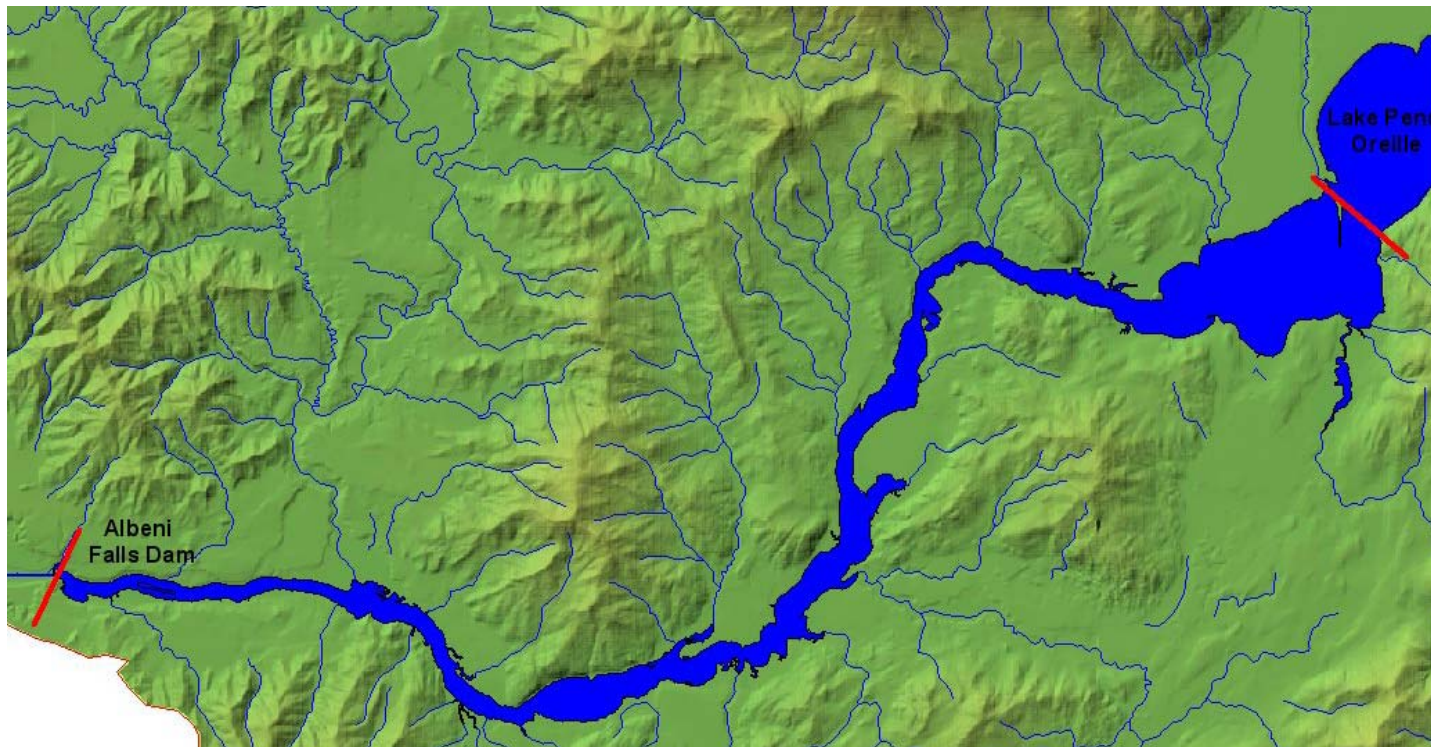


Pend Oreille River - Idaho Water Quality and Hydrodynamic Model



Idaho Department of
Environmental Quality

Water Quality Research Group



Pend Oreille River Model – Idaho Model Scenarios



1.0 Current Simulation, calibrated model

2.0 Impounded at Albeni Falls Dam, No NPDES discharges

2.5 Impounded at Albeni Falls Dam, No Nonpoint Sources
(tributary temperatures set to natural temperatures)

4.0 Unimpounded at Albeni Falls Dam, NPDES and Nonpoint Sources at
existing conditions

8.0 Pristine Simulation

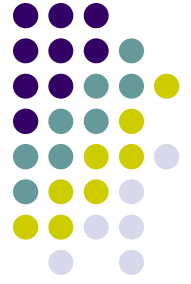
Unimpounded at Albeni Falls Dam

No NPDES discharges

No Nonpoint Sources

Shade set at Potential Natural Vegetation

Pend Oreille River Model – Idaho Model Scenario Comparisons



- Existing Conditions to Natural Conditions (Scenarios 1 and 8)
- Point Source Contributions (Scenarios 1 and 2)
- Nonpoint Source Contributions (Scenarios 1 and 2.5)
- Albeni Falls Dam Contribution (Scenarios 1 and 4)
- Vegetation Bank Shading (Scenario 8, varying SRF, Veg. density)

Pend Oreille River Model – Idaho Model Scenario Comparisons

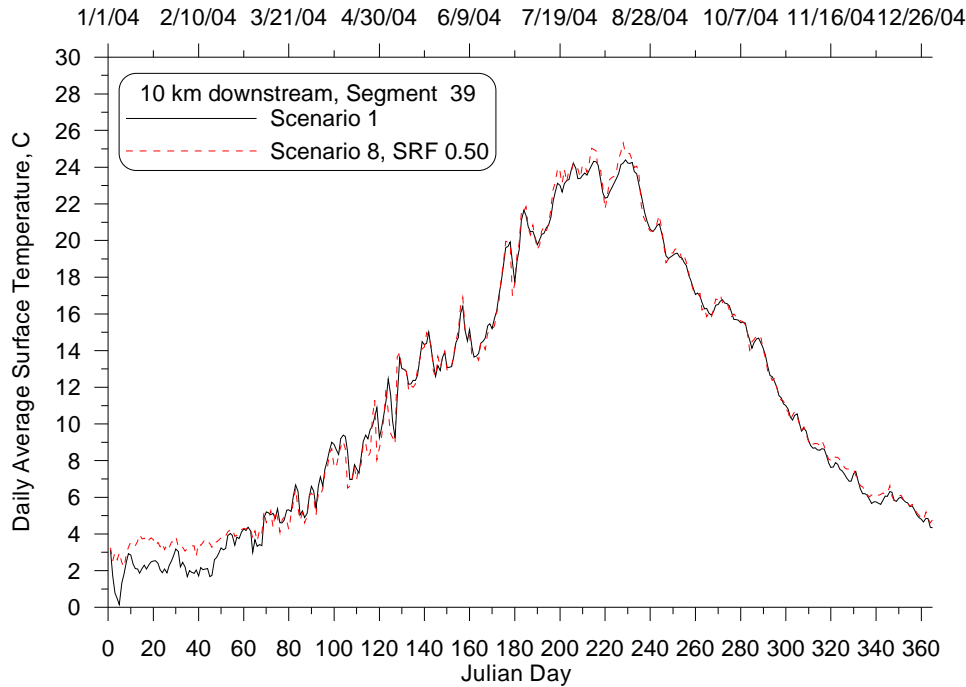
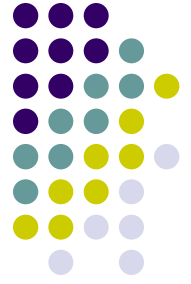


- Time Series Comparisons
 - Locations
 - 10 km downstream (Model Segment 36)
 - 36 km downstream (Model Segment 136)
 - Albeni Falls Dam (Model Segment 183)
 - Statistics
 - Daily average: bottom*, surface* and volume weighted
 - Daily maximum: surface*
- Longitudinal Profile Comparisons
 - Statistics, August 16th, 2004
 - Daily average: volume weighted
 - Daily maximum: surface*

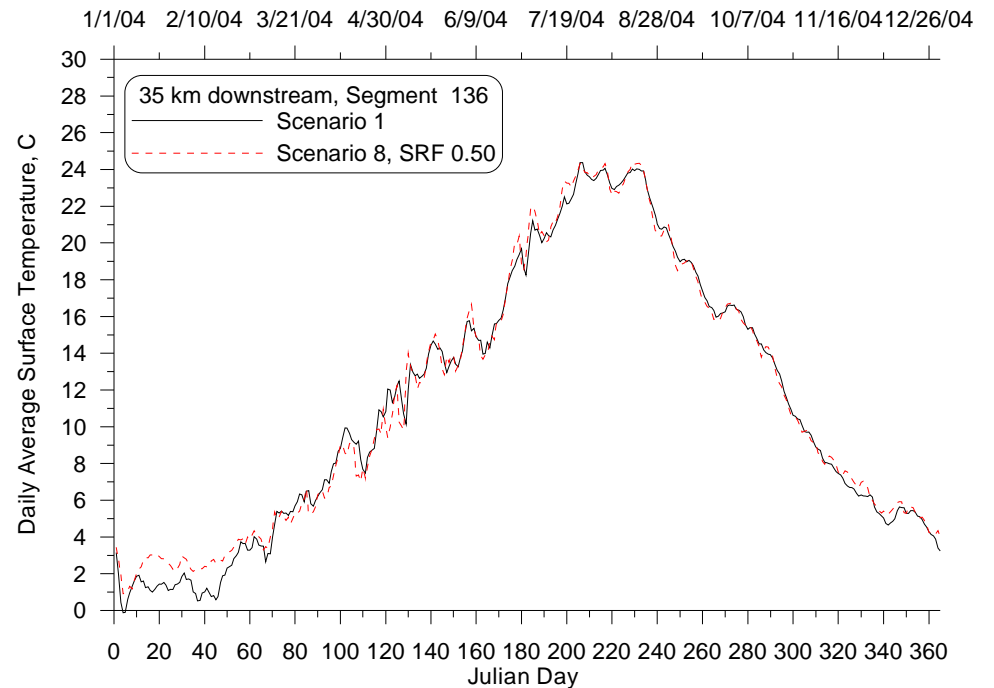
*1 m depth volume weighted

Model Scenario Comparison Results

Existing Conditions to Natural Conditions (Scenarios 1 and 8)

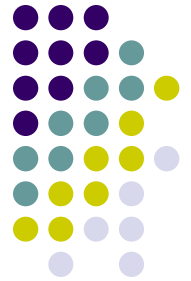


Time Series
Daily Average Surface Temperature

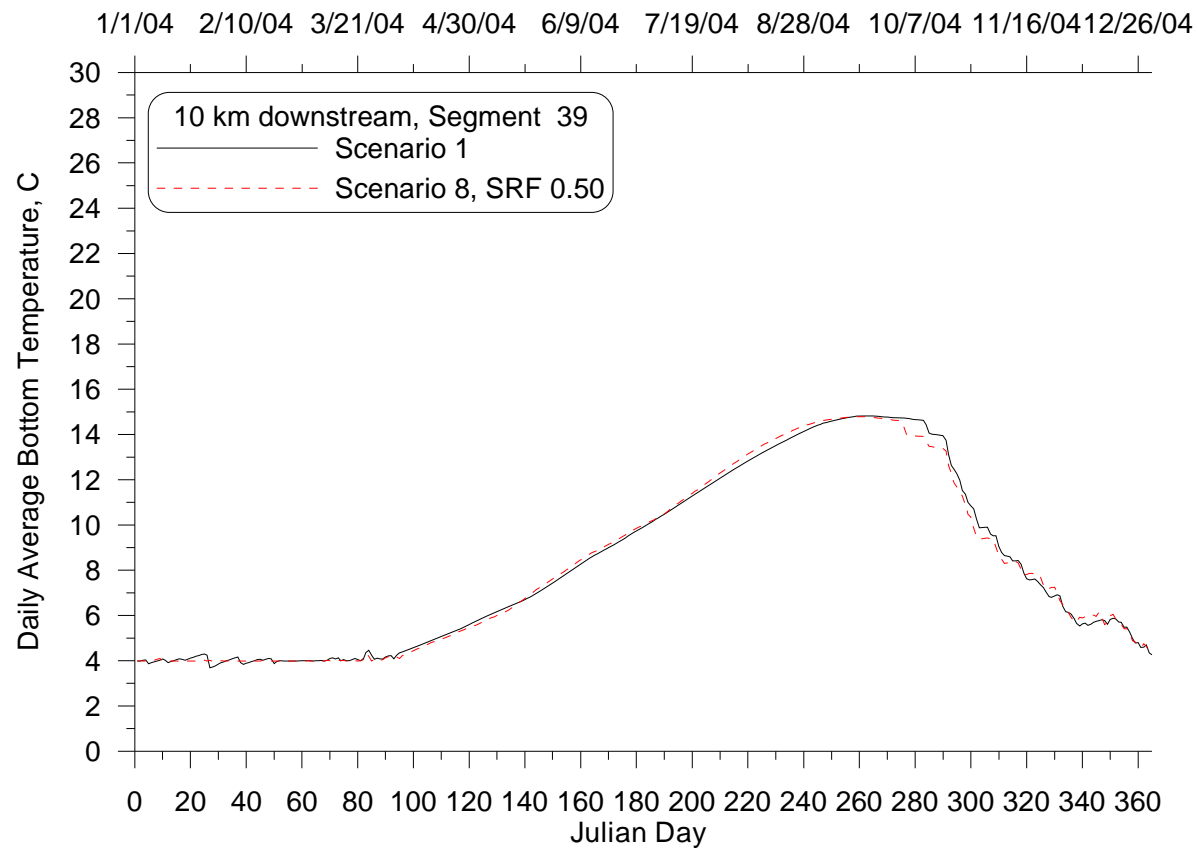


Model Scenario Comparison Results

Existing Conditions to Natural Conditions (Scenarios 1 and 8)

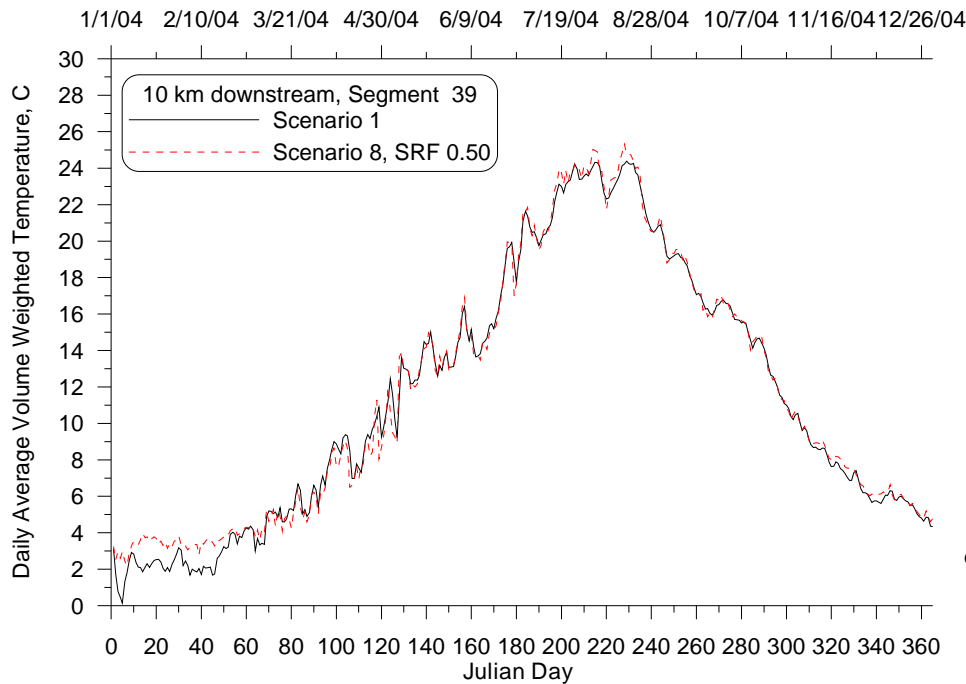
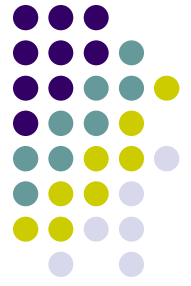


Time Series Daily Average Bottom Temperature

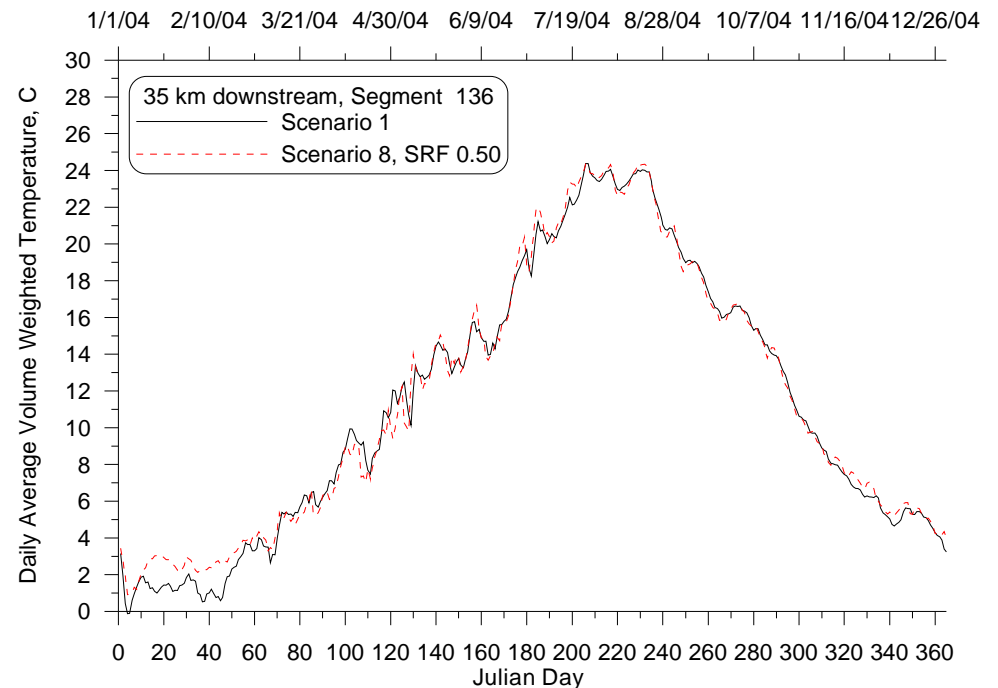


Model Scenario Comparison Results

Existing Conditions to Natural Conditions (Scenarios 1 and 8)

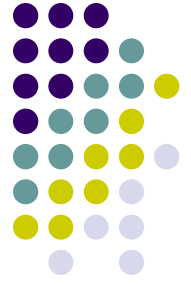


Time Series
Daily Average Volume-Weighted
Temperature

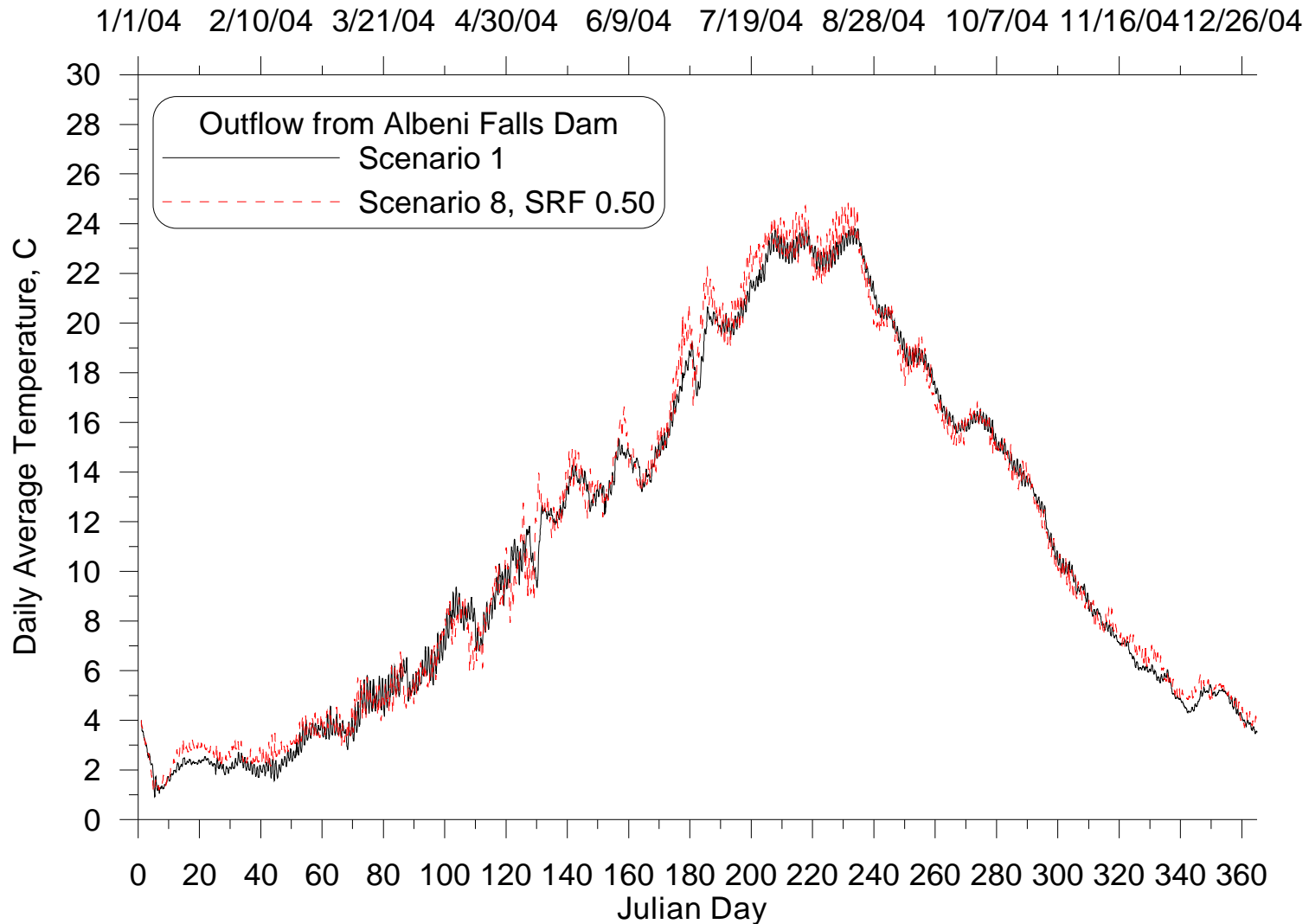


Model Scenario Comparison Results

Existing Conditions to Natural Conditions (Scenarios 1 and 8)

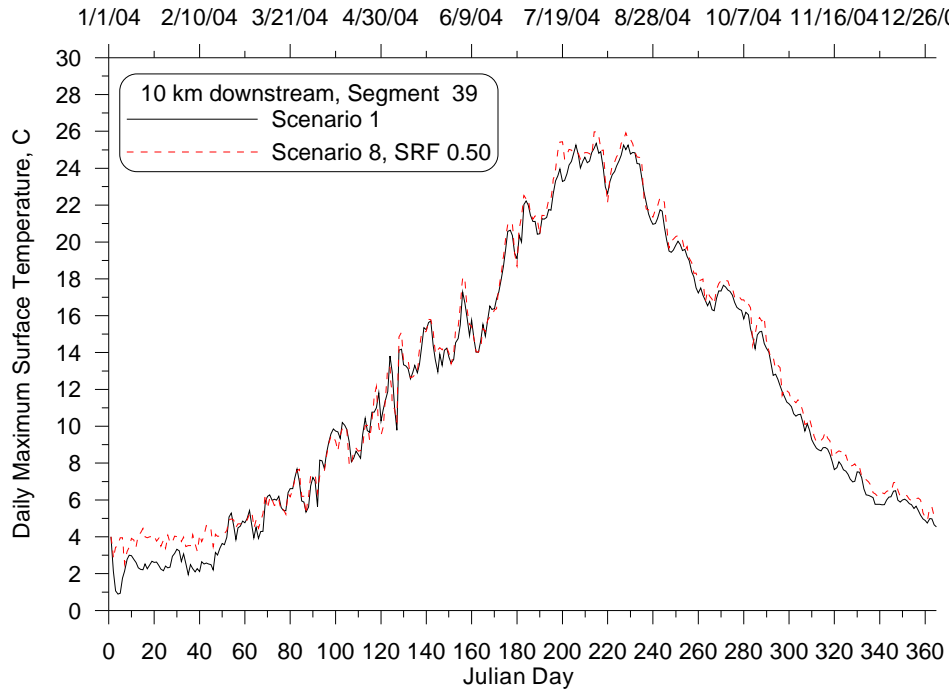
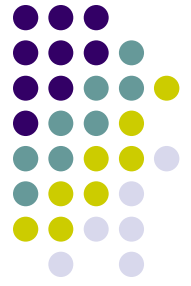


Time Series Daily Average Temperature

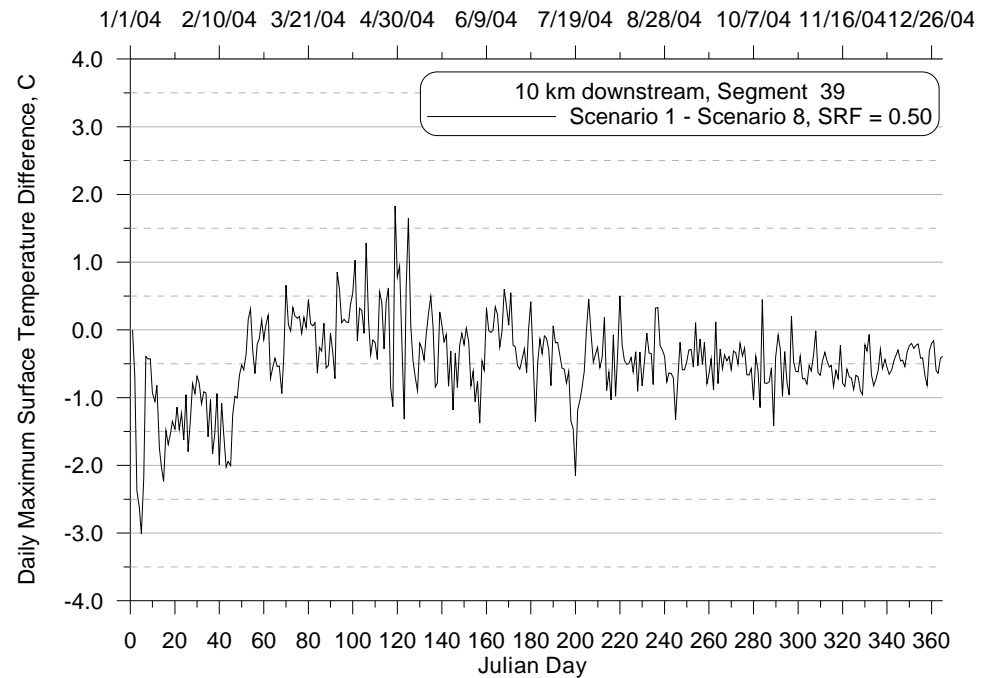


Model Scenario Comparison Results

Existing Conditions to Natural Conditions (Scenarios 1 and 8)

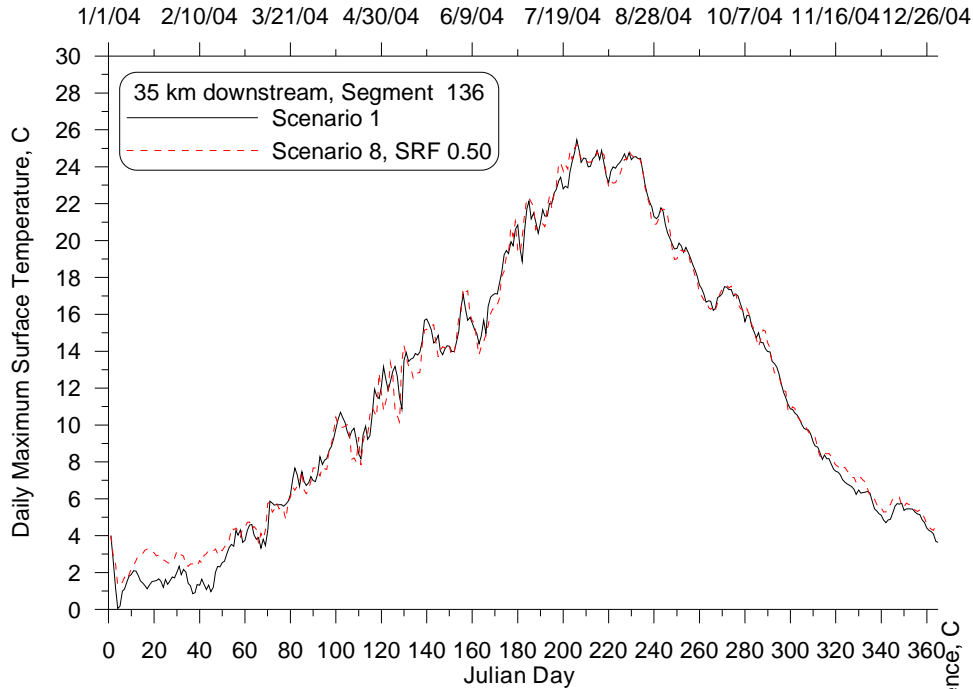
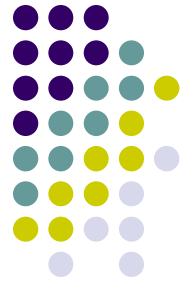


Time Series
Daily Maximum Surface Temperature

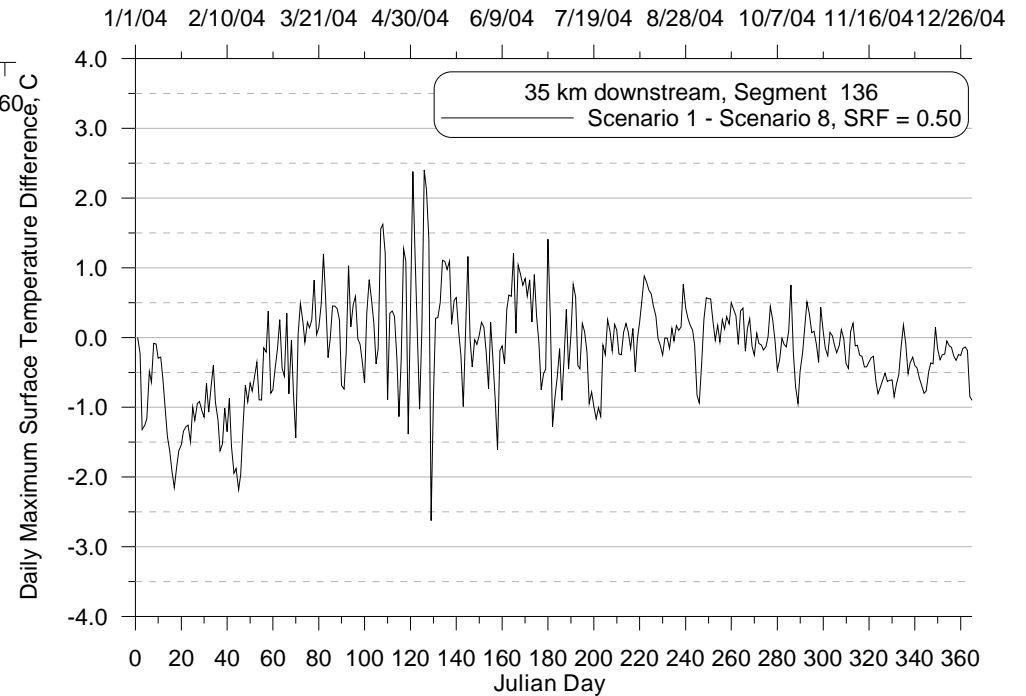


Model Scenario Comparison Results

Existing Conditions to Natural Conditions (Scenarios 1 and 8)

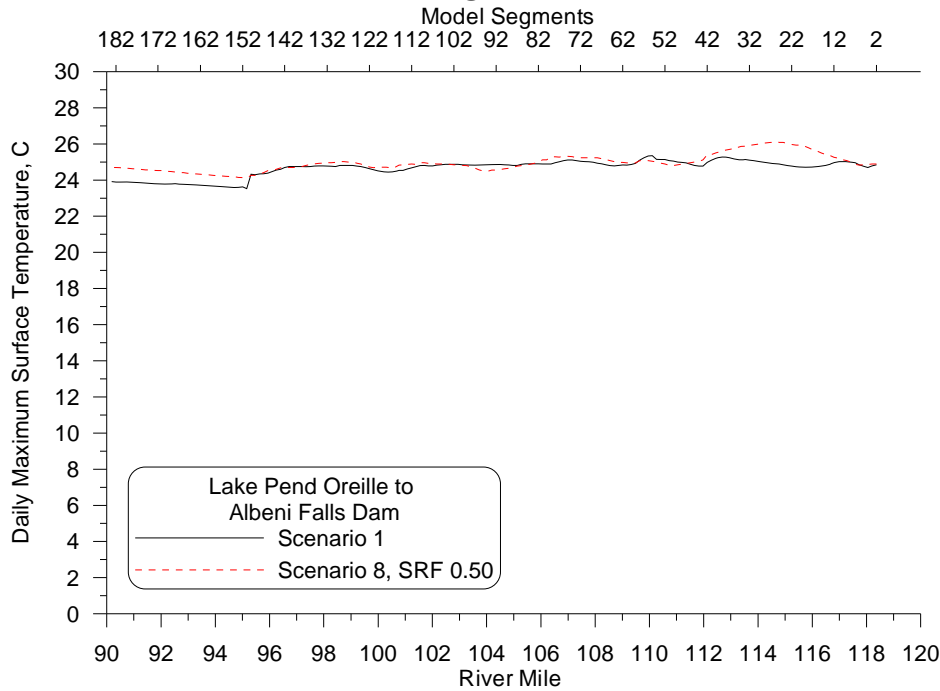


Time Series
Daily Maximum Surface Temperature



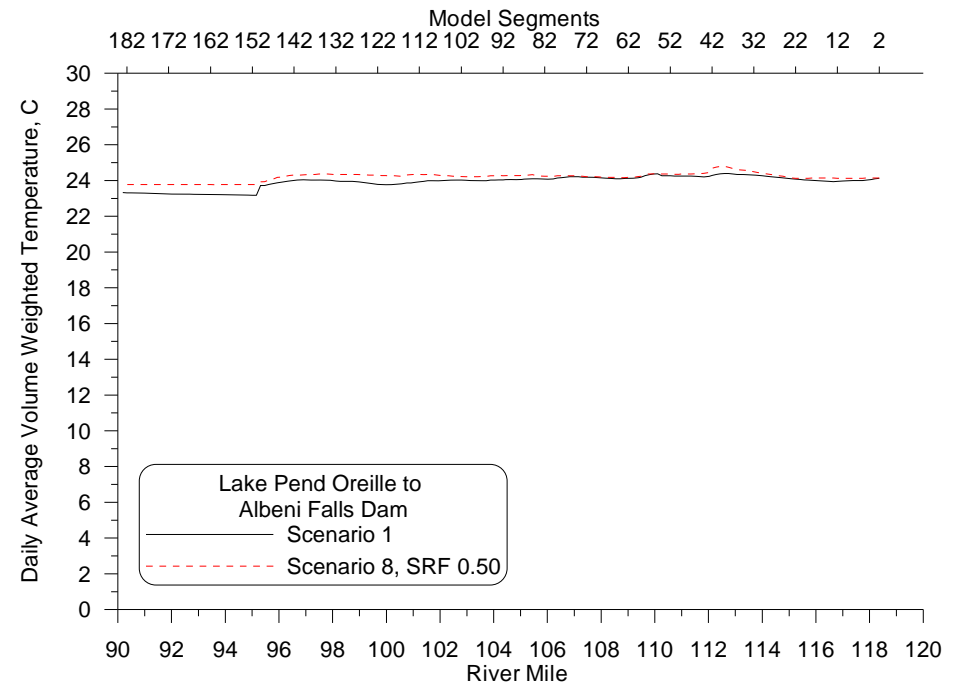
Model Scenario Comparison Results

Existing Conditions to Natural Conditions (Scenarios 1 and 8)



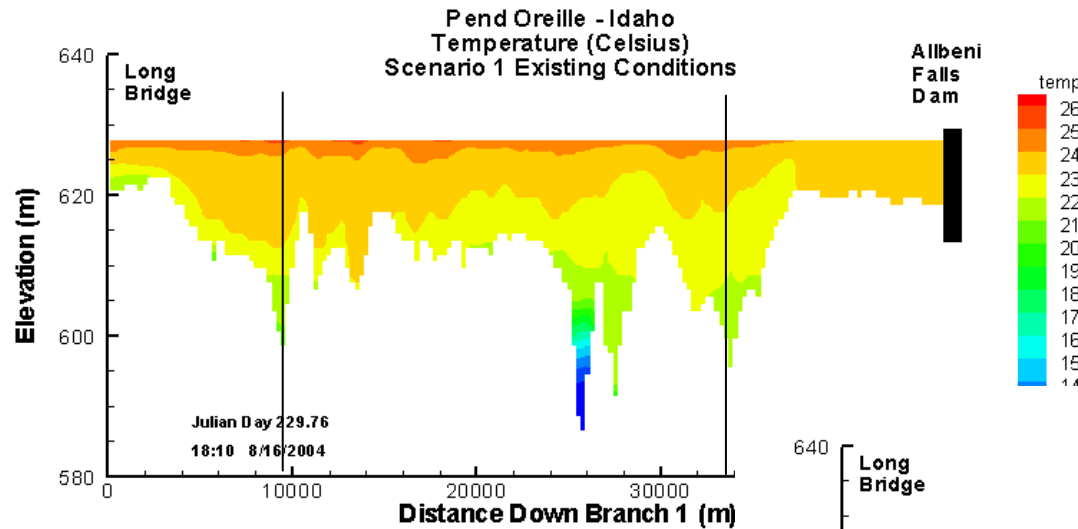
Longitudinal Profile, August 16th, 2004
 Daily Average Maximum Surface Temperature

Longitudinal Profile, August 16th, 2004
 Daily Average Volume-Weighted Temperature

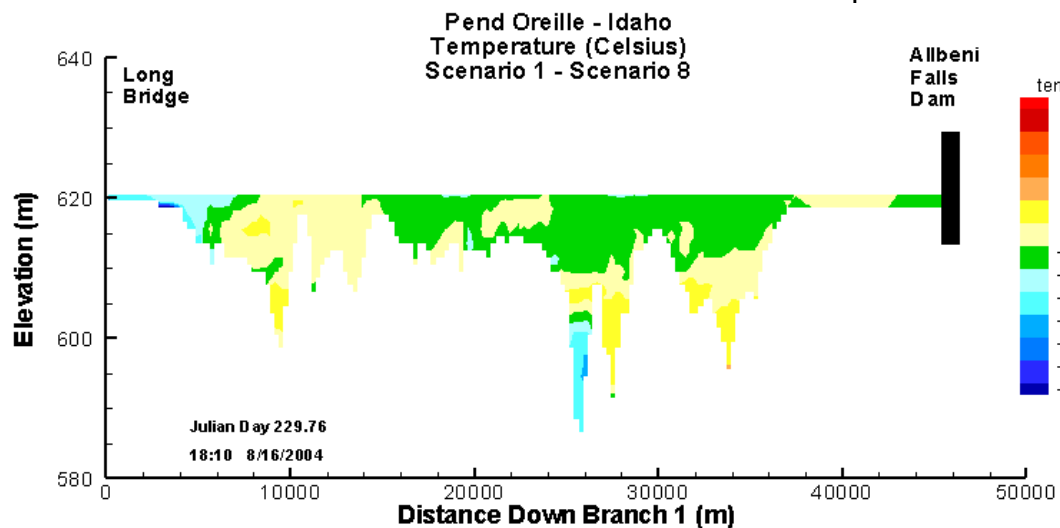
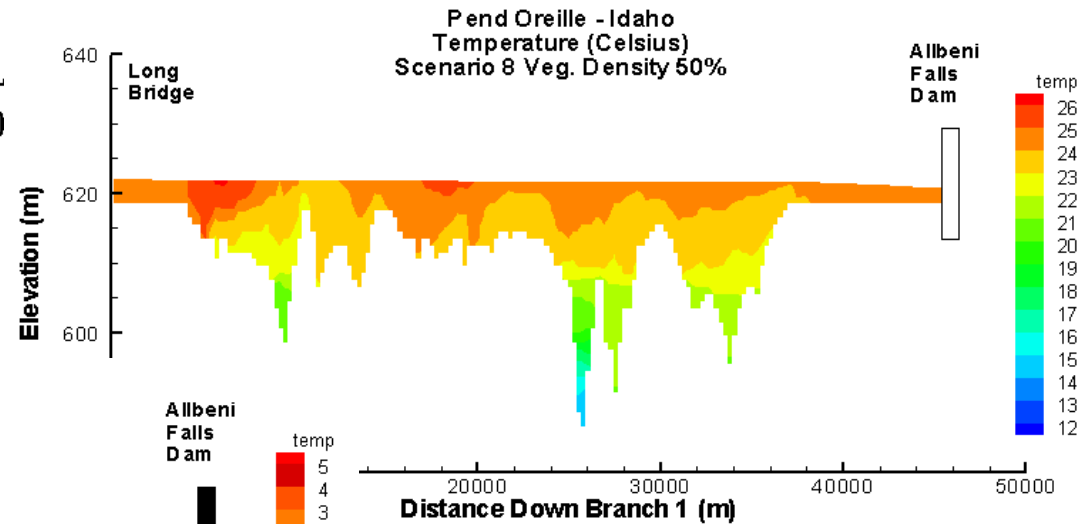


Model Scenario Comparison Results

Existing Conditions to Natural Conditions (Scenarios 1 and 8)



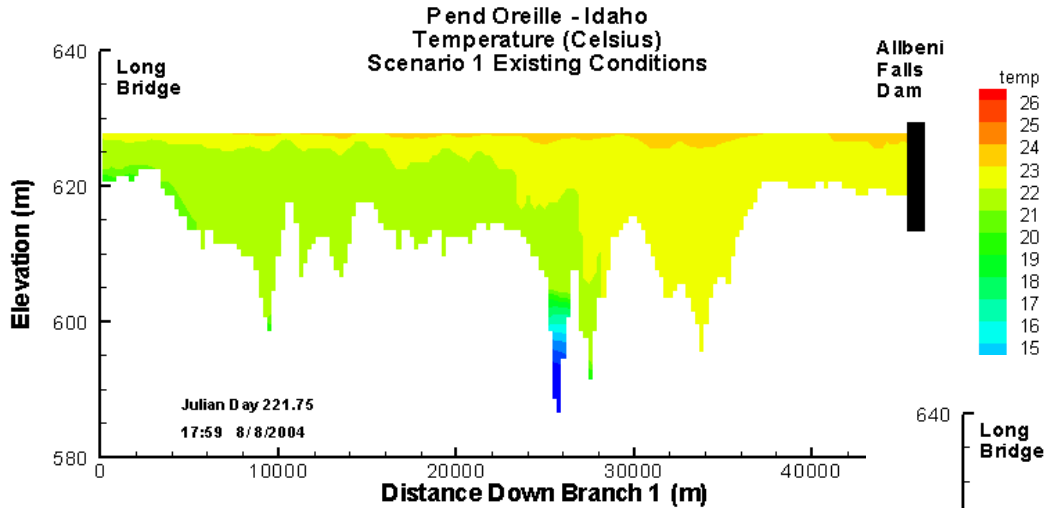
Longitudinal Profile
Snapshots



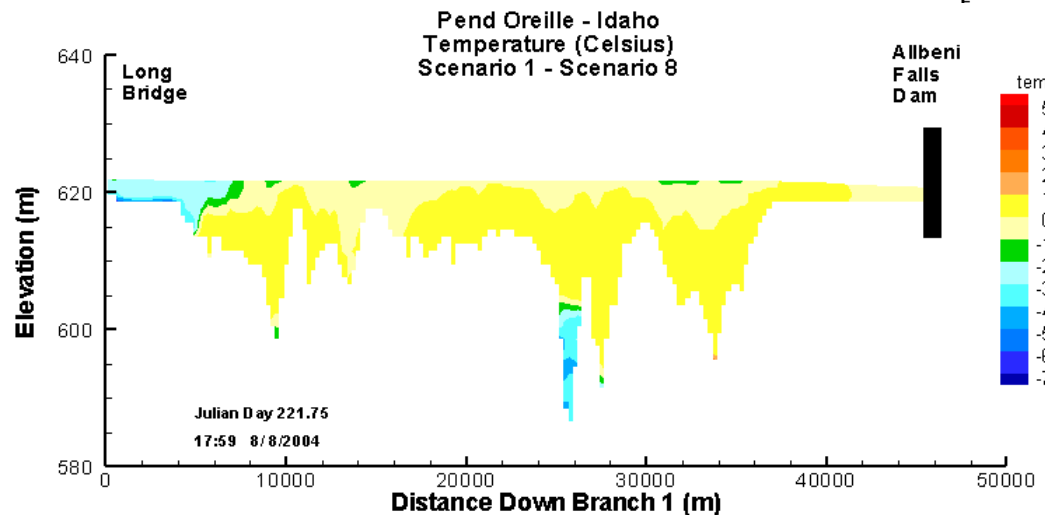
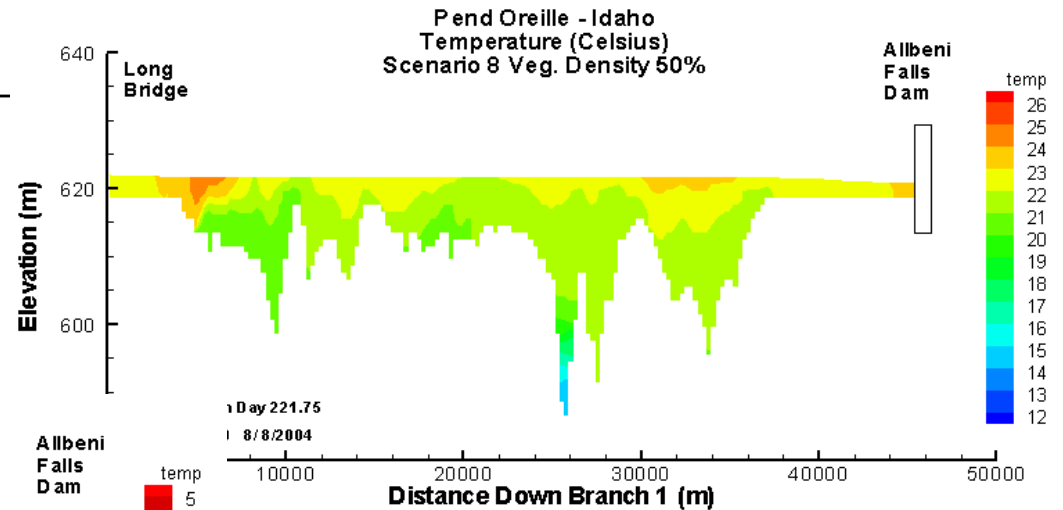
August 16th, 2004

Model Scenario Comparison Results

Existing Conditions to Natural Conditions (Scenarios 1 and 8)



Longitudinal Profile
Snapshots

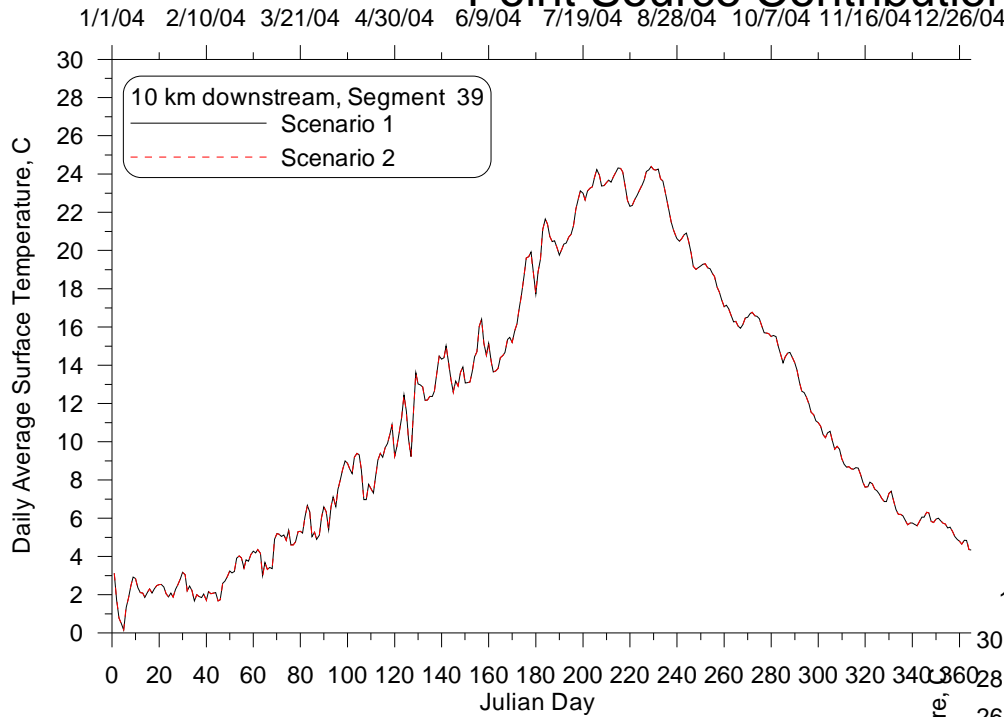


August 8th, 2004

Model Scenario Comparison Results

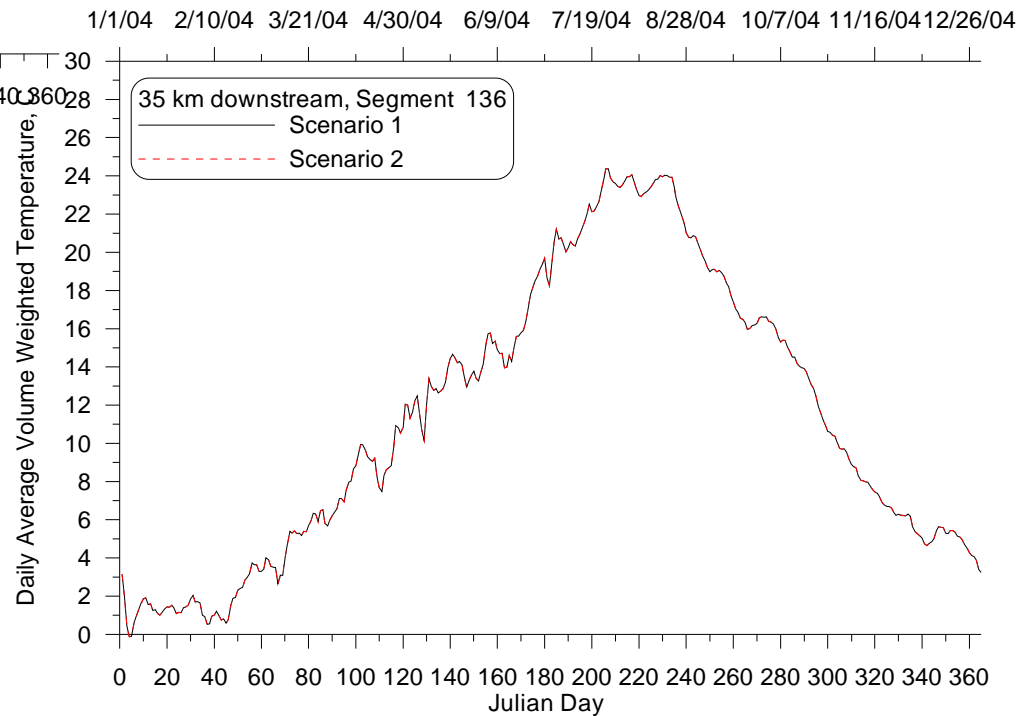


Point Source Contributions (Scenarios 1 and 2)



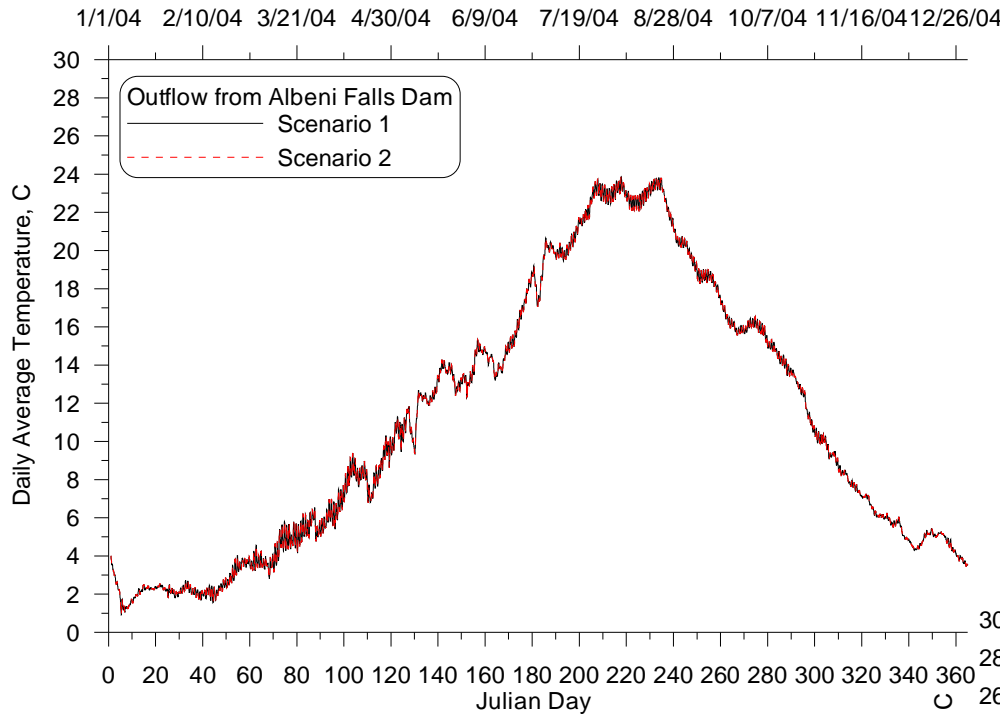
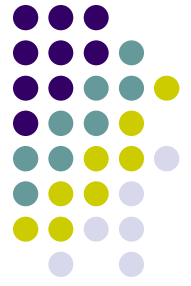
Time Series Daily Average Surface Temperature

Time Series Daily Average Volume-Weighted Temperature



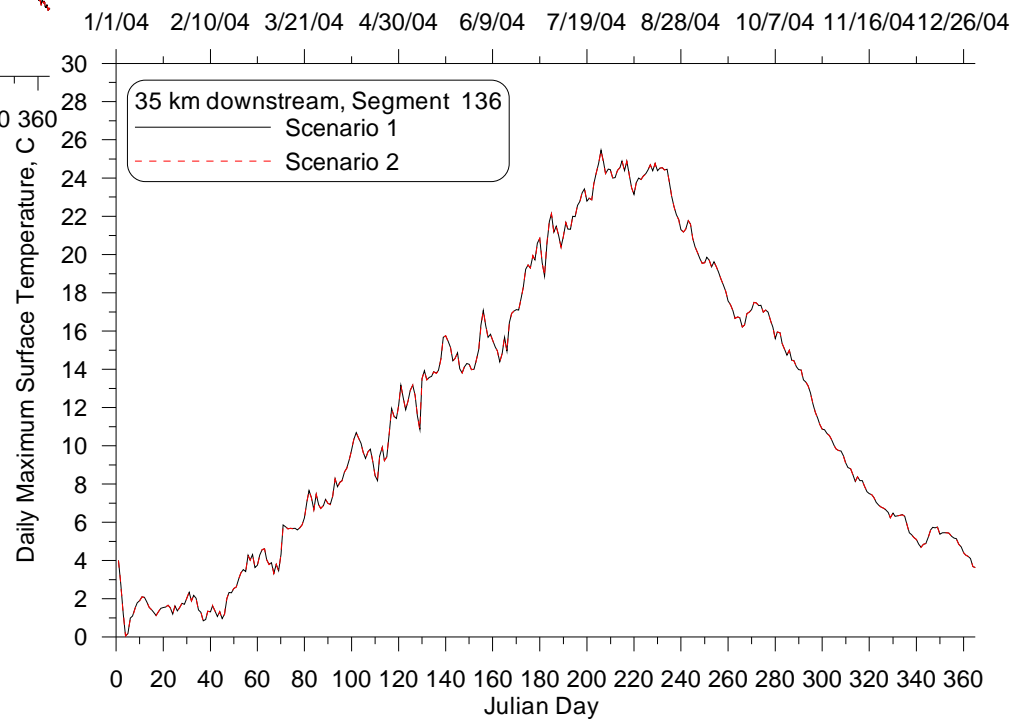
Model Scenario Comparison Results

Point Source Contributions (Scenarios 1 and 2)



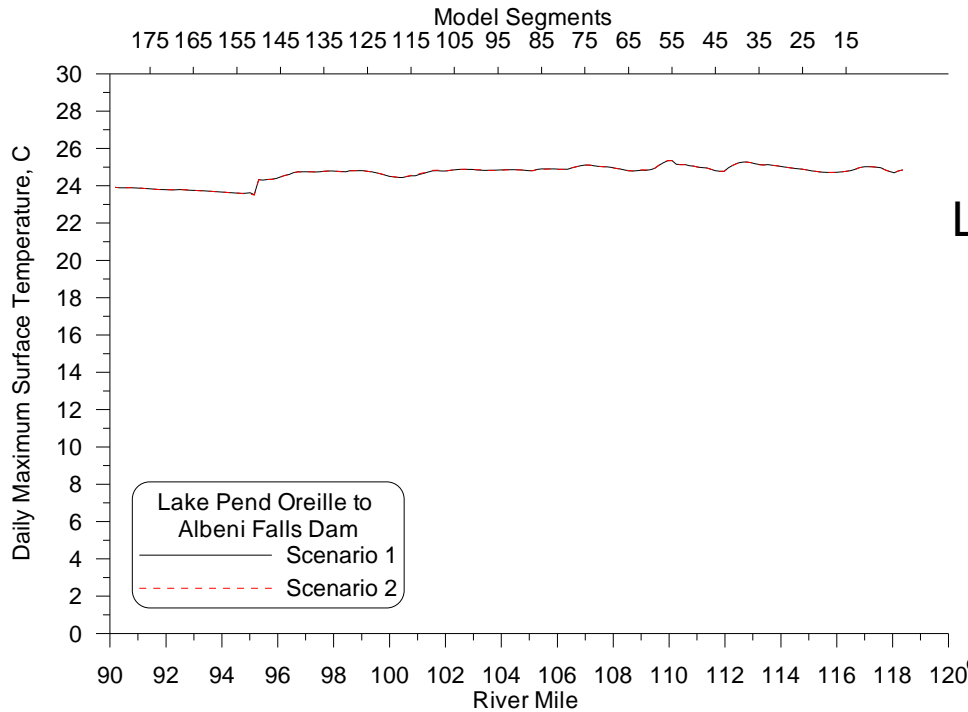
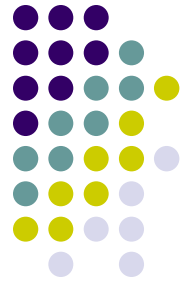
Time Series
Daily Average Temperature

Time Series
Daily Maximum Surface
Temperature

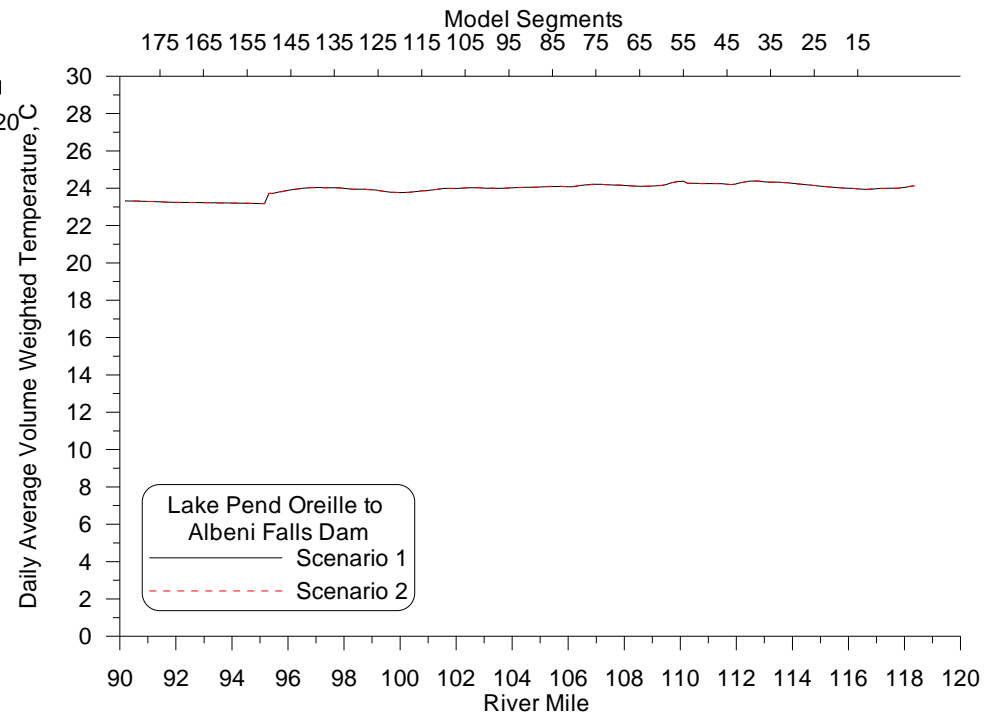


Model Scenario Comparison Results

Point Source Contributions (Scenarios 1 and 2)



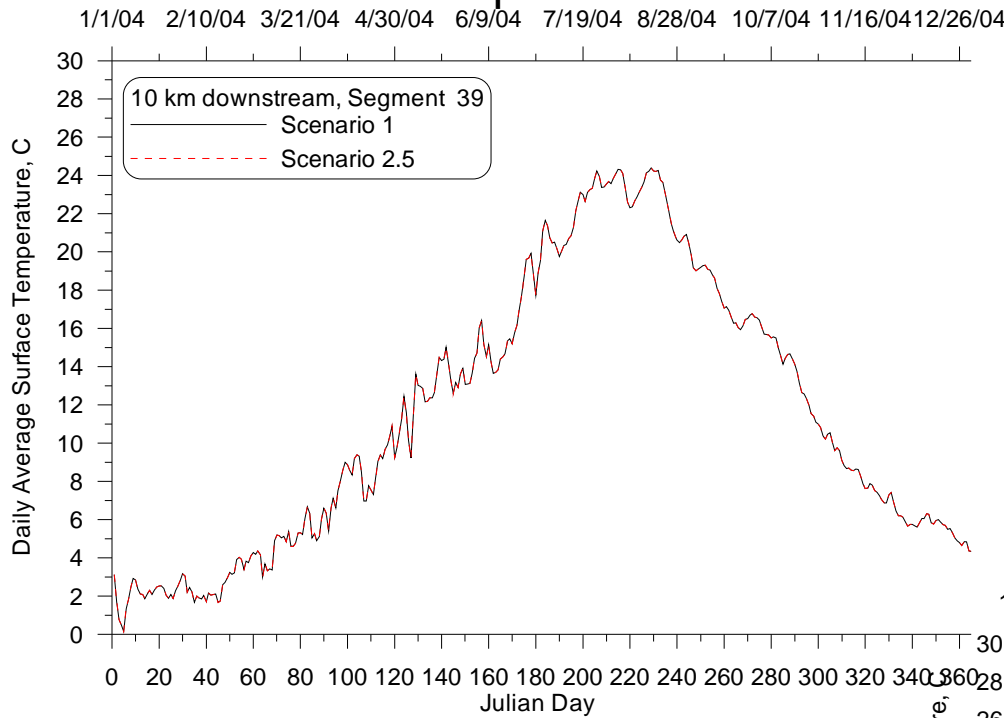
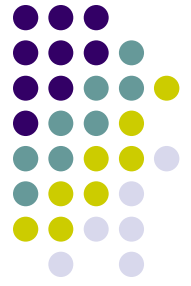
Longitudinal Profile, August 16th, 2004 Daily Average Maximum Surface Temperature



Longitudinal Profile, August 16th, 2004 Daily Average Volume-Weighted Temperature

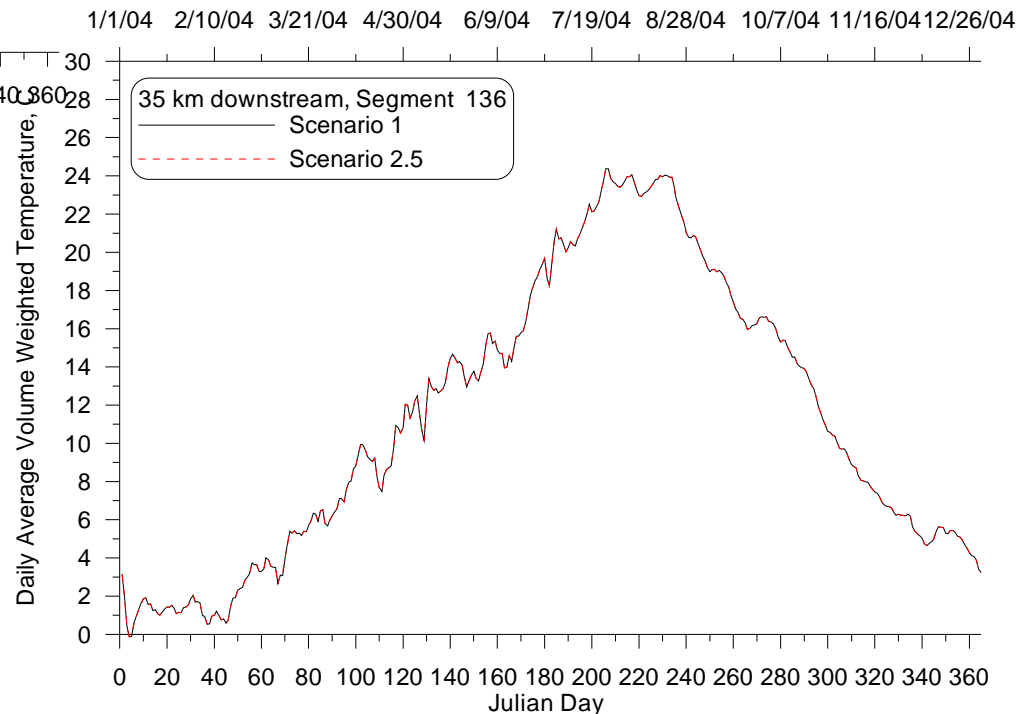
Model Scenario Comparison Results

Nonpoint Source Contributions (Scenarios 1 and 2.5)



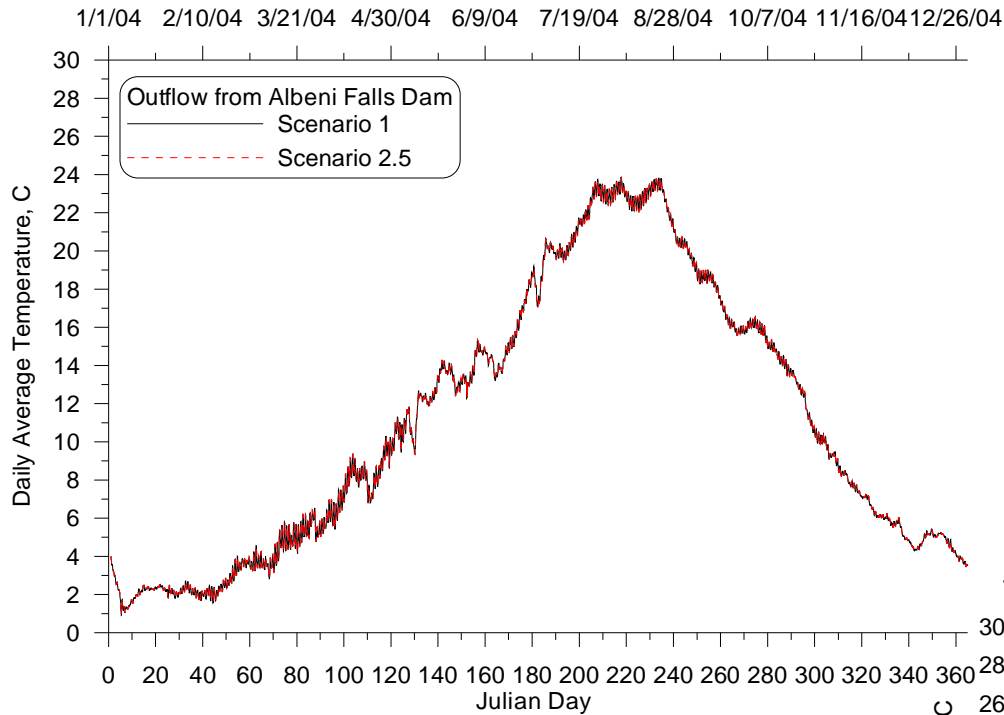
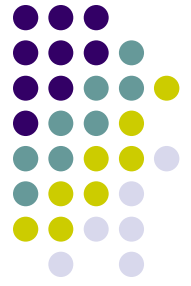
Time Series
Daily Average Surface Temperature

Time Series
Daily Average Volume-Weighted
Temperature



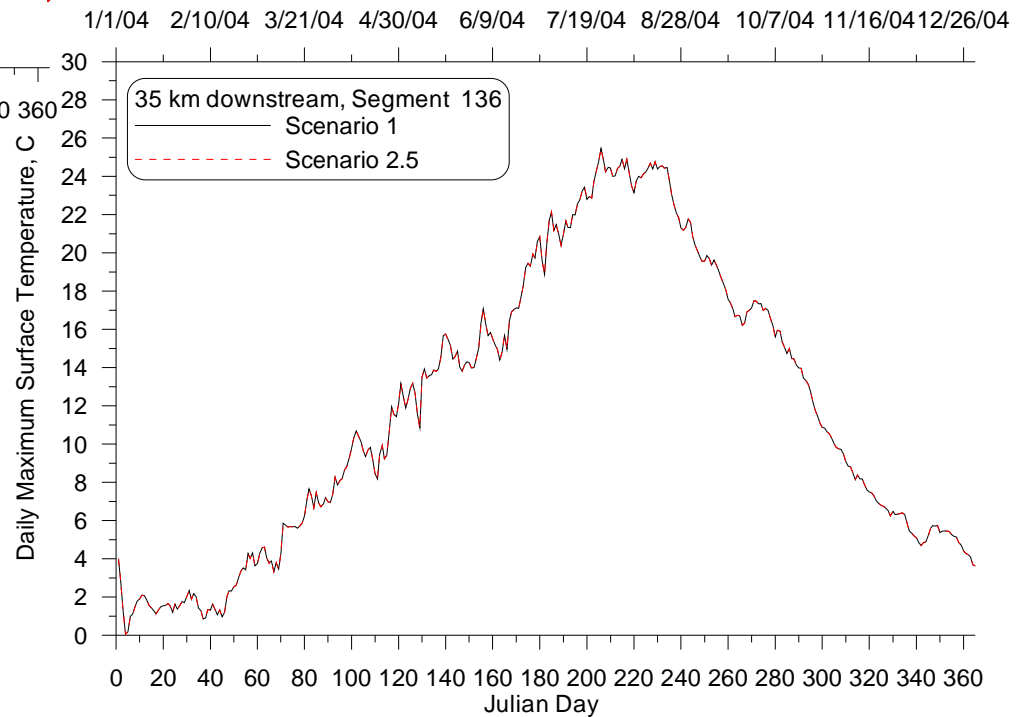
Model Scenario Comparison Results

Nonpoint Source Contributions (Scenarios 1 and 2.5)



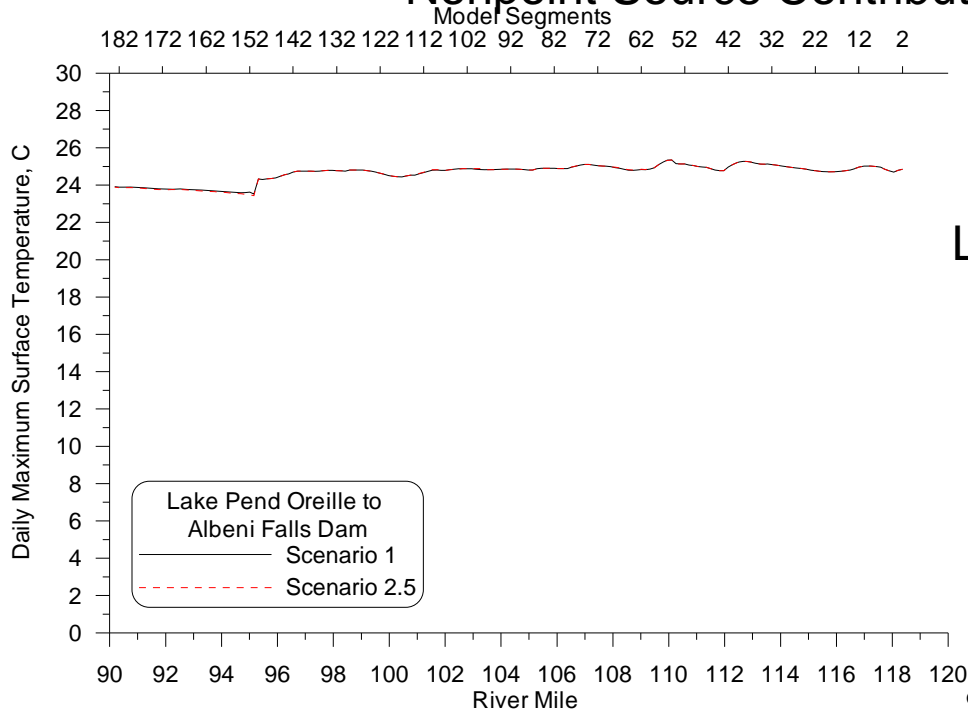
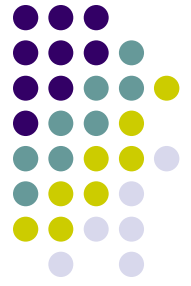
Time Series
Daily Average Temperature

Time Series
Daily Maximum Surface
Temperature



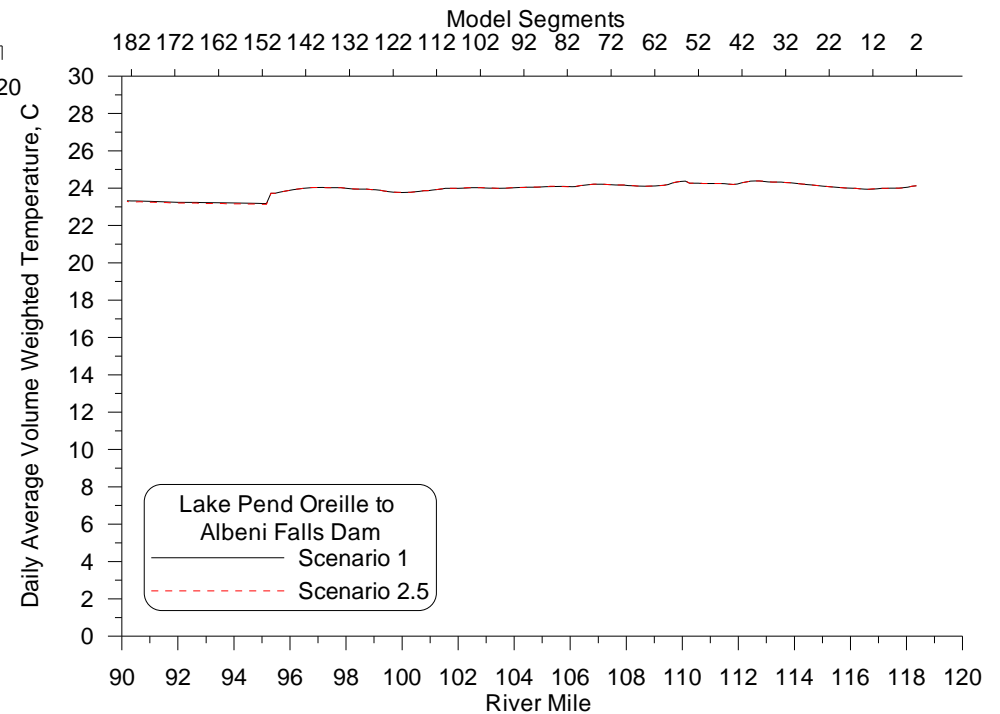
Model Scenario Comparison Results

Nonpoint Source Contributions (Scenarios 1 and 2.5)



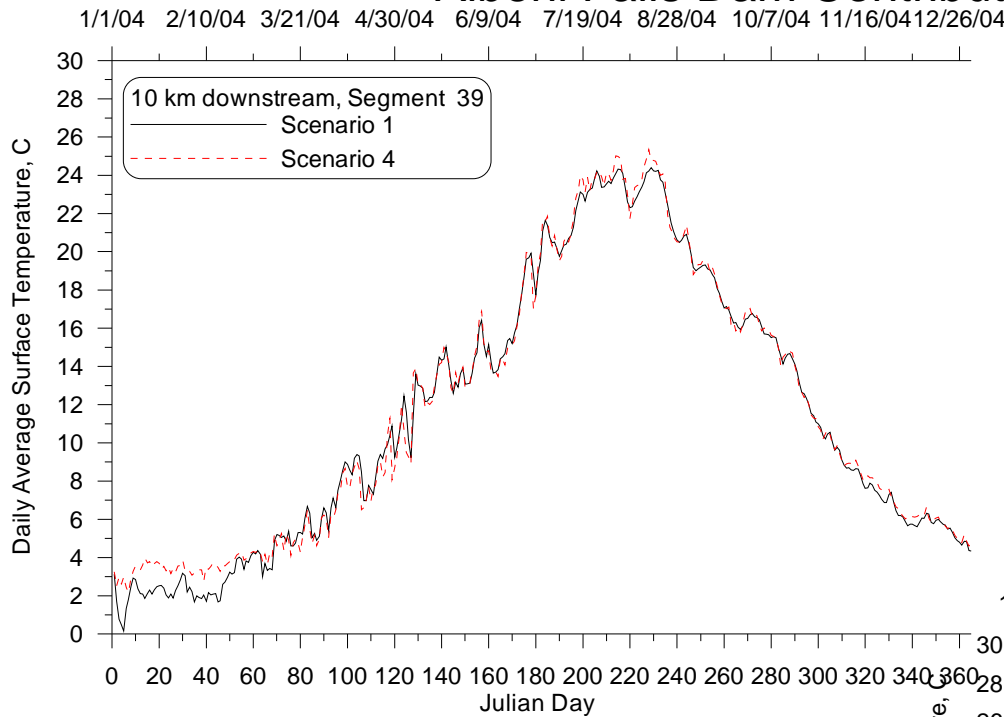
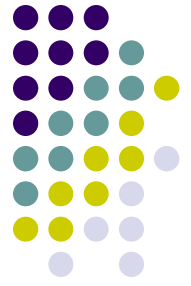
Longitudinal Profile, August 16th, 2004
Daily Average Maximum Surface Temperature

Longitudinal Profile, August 16th, 2004
Daily Average Volume-Weighted Temperature



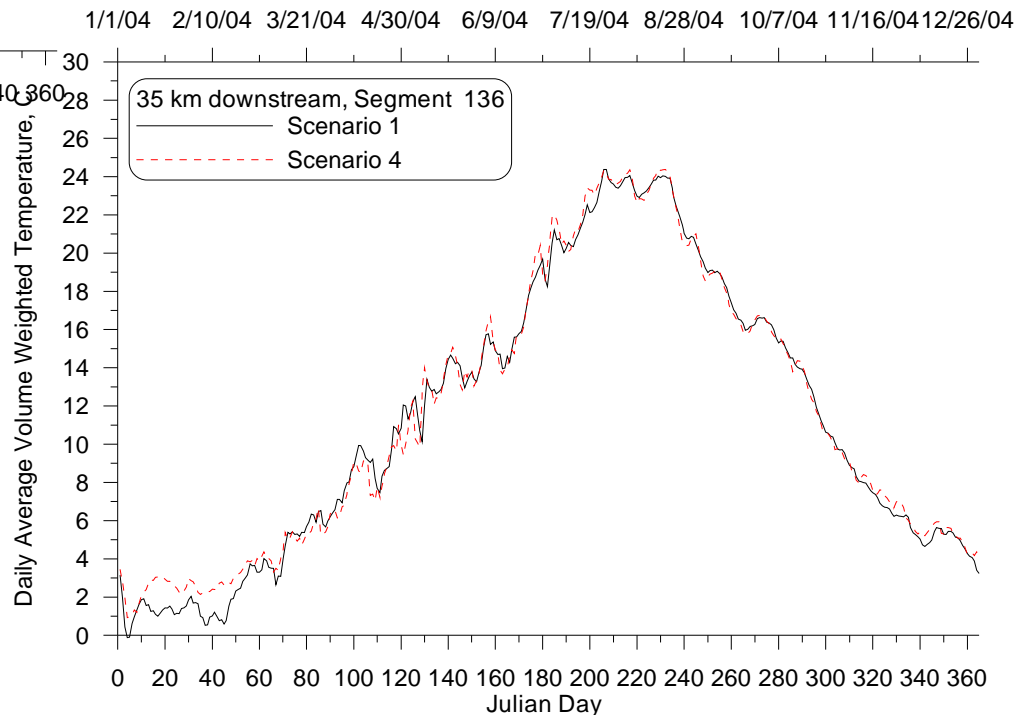
Model Scenario Comparison Results

Albeni Falls Dam Contribution (Scenarios 1 and 4)



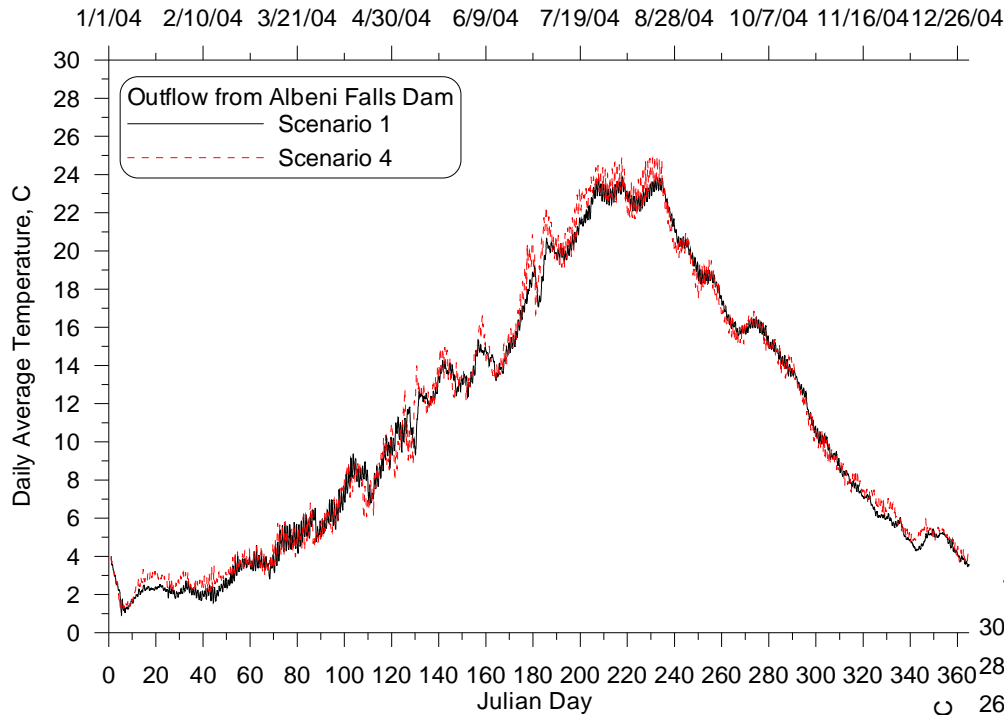
Time Series
Daily Average Surface Temperature

Time Series
Daily Average Volume-Weighted
Temperature



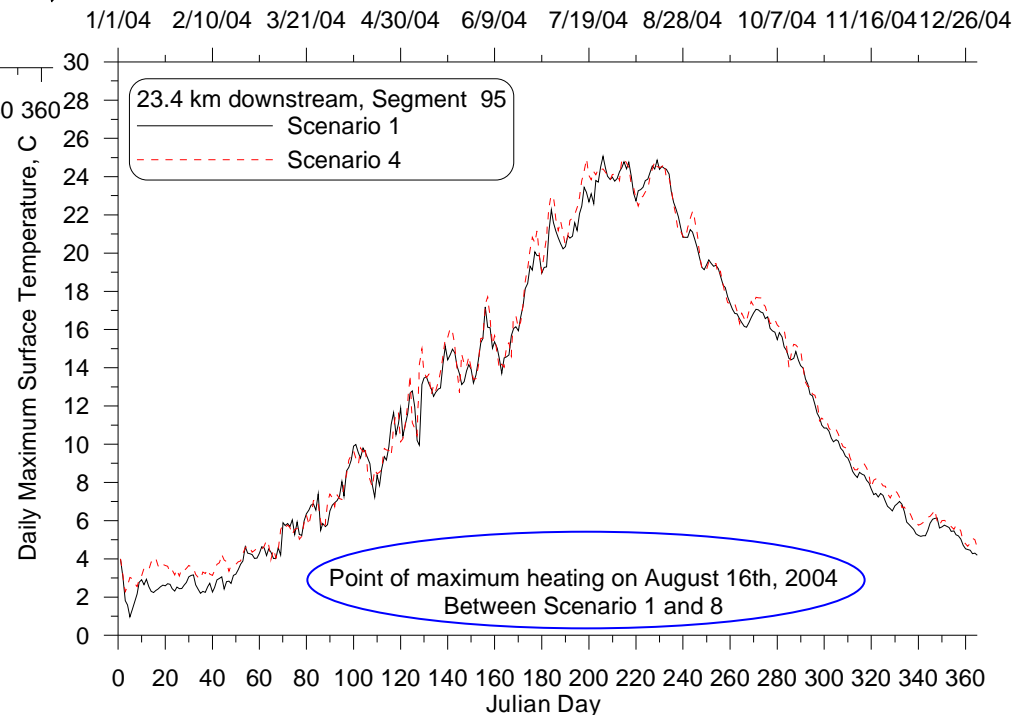
Model Scenario Comparison Results

Albeni Falls Dam Contribution (Scenarios 1 and 4)



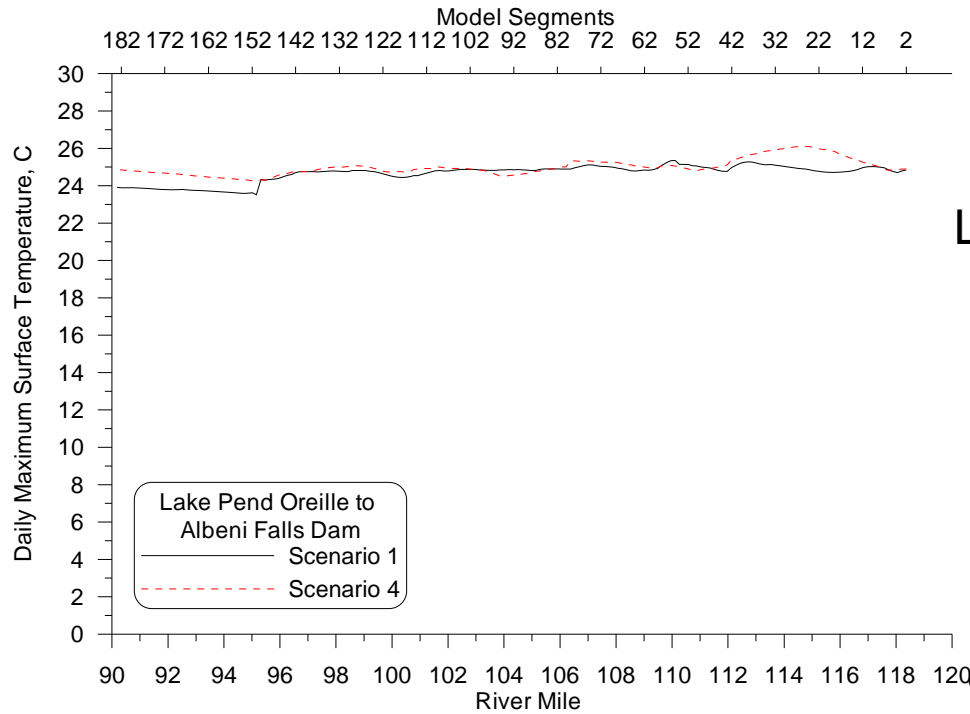
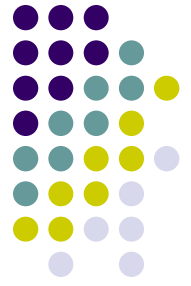
Time Series
Daily Average Temperature

Time Series
Daily Maximum Surface
Temperature



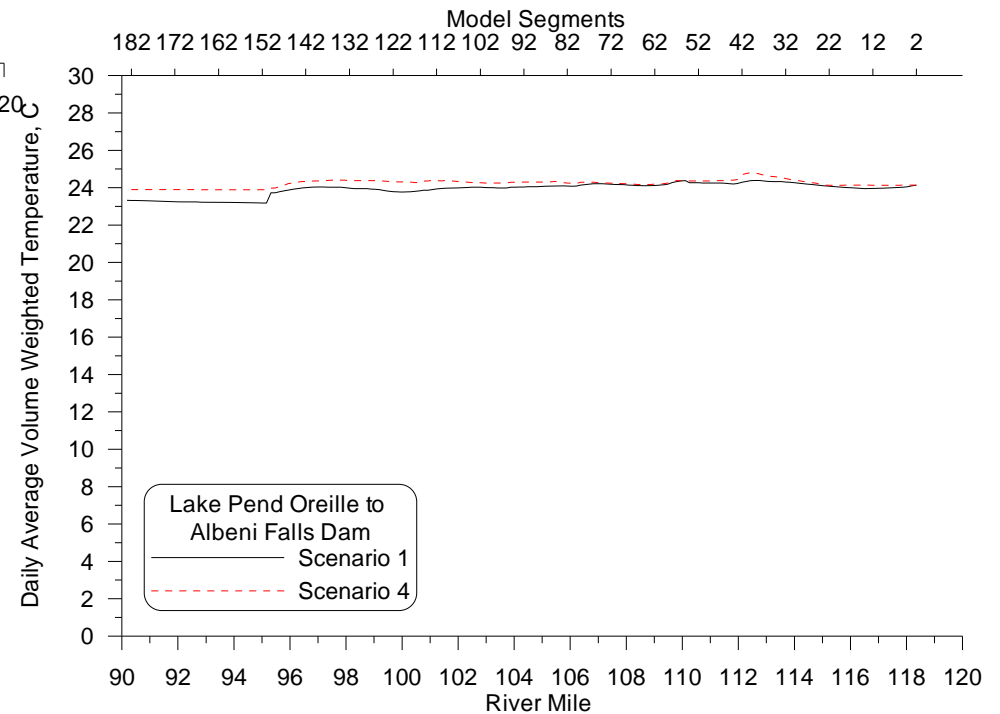
Model Scenario Comparison Results

Albeni Falls Dam Contribution (Scenarios 1 and 4)



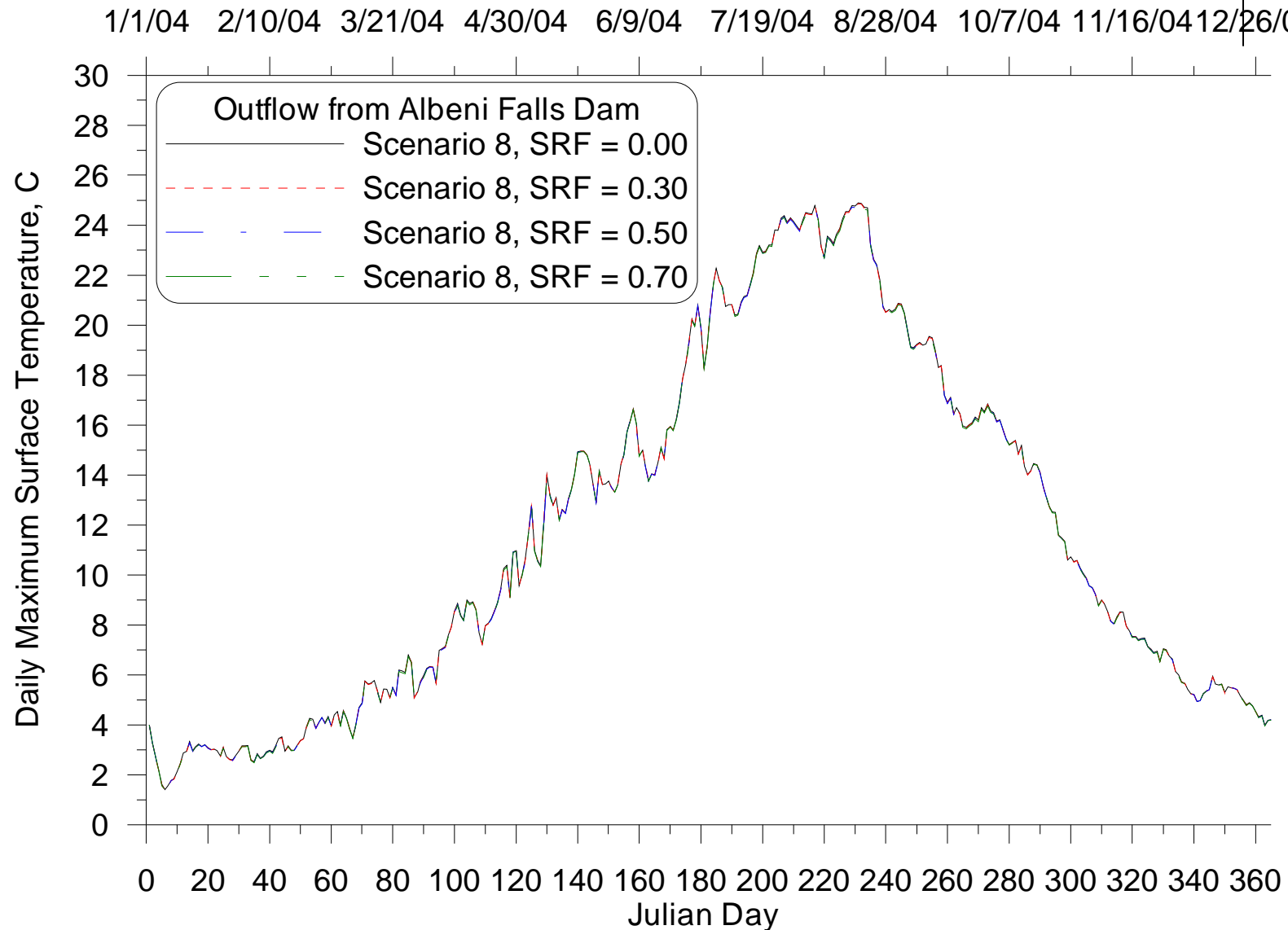
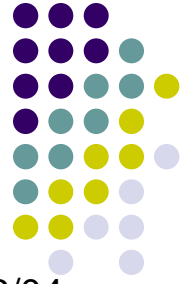
Longitudinal Profile, August 16th, 2004
 Daily Average Maximum Surface Temperature

Longitudinal Profile, August 16th, 2004
 Daily Average Volume-Weighted Temperature

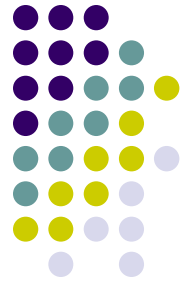


Model Scenario Comparison Results

Vegetation Bank Shading (Scenario 8, varying SRF, Veg. density)



Summary



- Model simulations were run for 5 difference scenarios:
- Existing Conditions to Natural Conditions (Scenarios 1 and 8)
 - Comparisons shows periods (time and space) of increased and decreased temperature
- Point Source Contributions (Scenarios 1 and 2)
 - River temperature were not sensitive to point source contributions
- Nonpoint Source Contributions (Scenarios 1 and 2.5)
 - River temperature were not sensitive to non point source contributions
- Albeni Falls Dam Contribution (Scenarios 1 and 4)
 - Results are similar to Scenario 8
- Vegetation Bank Shading (Scenario 8, varying SRF, Veg. density)
 - River temperature were not sensitive to vegetation density