Appendix C: Additional Modeling Results for FRFA Scenario 1 Future Condition Simulations
Figure C1-1

Depth Profiles of Model--predicted Orthophosphate in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–2

Depth Profiles of Model–predicted Dissolved Organic Phosphorus in Segment 10 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–3
Depth Profiles of Model–predicted Total Organic Phosphorus in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–4

Depth Profiles of Model–predicted Total Phosphorus in Segment 10 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–5
Depth Profiles of Model–predicted Ammonia in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–6
Depth Profiles of Model–predicted Nitrite and Nitrate in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1−7

Depth Profiles of Model–predicted Total Kjeldahl Nitrogen in Segment 10 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–8

Depth Profiles of Model–predicted Total Nitrogen in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1-9

Depth Profiles of Model-predicted Dissolved Organic Nitrogen in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–10

Depth Profiles of Model–predicted Particulate Organic Nitrogen in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–11

Depth Profiles of Model–predicted Particulate Organic Matter in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1−12

Depth Profiles of Model−predicted CBOD Ultimate in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–13

Depth Profiles of Model–predicted Algae Group 1 in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–14
Depth Profiles of Model–predicted Algae Group 2 in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–15

Depth Profiles of Model–predicted Chlorophyll—a in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–16
Depth Profiles of Model–predicted Total Suspended Solids in Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–17

Depth Profiles of Model–predicted Inorganic Suspended Solids in Segment 10 for FRFA Scenario 1 Future Condition Simulation

Inorganic Suspended Solids (mg/L)

0.0
0.9
1.8
2.8
3.7
4.6

Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–18

Depth Profiles of Model–predicted pH in Segment 10 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C1–19

Depth Profiles of Model–predicted Coliform in Segment 10 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2−1

Depth Profiles of Model−predicted Orthophosphate in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2−2

Depth Profiles of Model–predicted Dissolved Organic Phosphorus in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2−3

Depth Profiles of Model–predicted Total Organic Phosphorus in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2−4

Depth Profiles of Model–predicted Total Phosphorus in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2–5

Depth Profiles of Model–predicted Ammonia in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2–6

Depth Profiles of Model–predicted Nitrite and Nitrate in Segment 6 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2–7

Depth Profiles of Model–predicted Total Kjeldahl Nitrogen in Segment 6 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2–8

Depth Profiles of Model–predicted Total Nitrogen in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2-9

Depth Profiles of Model–predicted Dissolved Organic Nitrogen in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2–10

Depth Profiles of Model–predicted Particulate Organic Nitrogen in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
**Figure C2–11**

Depth Profiles of Model–predicted Particulate Organic Matter in Segment 6 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2–12
Depth Profiles of Model–predicted CBOD Ultimate in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2–13

Depth Profiles of Model–predicted Algae Group 1 in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2−14

Depth Profiles of Model−predicted Algae Group 2 in Segment 6 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2−15

Depth Profiles of Model–predicted Chlorophyll−a in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2−16

Depth Profiles of Model−predicted Total Suspended Solids in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2−17

Depth Profiles of Model−predicted Inorganic Suspended Solids in Segment 6 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2−18
Depth Profiles of Model−predicted pH in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C2–19
Depth Profiles of Model–predicted Coliform in Segment 6 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

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Figure C3–1
Outflow Concentrations for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

Model outputs are hourly
Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

Model outputs are hourly
Figure C3–3
Outflow Concentrations for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

Model outputs are hourly
Algae Group 1

Algae Group 2

Chlorophyll–a

Total Suspended Solids

Figure C3–4
Outflow Concentrations for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Model outputs are hourly

Current Condition
Future Condition
Figure C3–5
Outflow Concentrations for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

Model outputs are hourly
Orthophosphate

Dissolved Organic Phosphorus

Total Organic Phosphorus

Total Phosphorus

Figure C4-1
Concentrations in the Top 30 Feet of Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Model outputs are hourly
Concentrations in the Top 30 Feet of Segment 10 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

Model outputs are hourly
Figure C4–3

Concentrations in the Top 30 Feet of Segment 10 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

_Model outputs are hourly_
Figure C4-4

Concentrations in the Top 30 Feet of Segment 10 for FRFA Scenario 1 Future Condition Simulation

Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

Model outputs are hourly
Concentrations in the Top 30 Feet of Segment 10 for FRFA Scenario 1 Future Condition Simulation
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

*Model outputs are hourly*
Temperature < 16 °C and DO > 9.5 mg/L
Temperature < 16 °C and DO < 9.5 mg/L
Temperature > 16 °C and DO > 9.5 mg/L
Temperature > 16 °C and DO < 9.5 mg/L

Figure C5–1
FRFA Scenario 1 Future Condition Simulation, Model Segment 9: Temperature and DO Conditions That Are Suitable for Salmonids in Summer Reservoir Water Quality Model
Figure C5−2
FRFA Scenario 1 Future Condition Simulation, Model Segment 8: Temperature and DO Conditions That Are Suitable for Salmonids in Summer Reservoir Water Quality Model
Future Condition FRFA Scenario 1

Current Condition FRFA Scenario 1

Elevation (feet in NGVD29)

Temperature < 16 °C and DO > 9.5 mg/L
Temperature < 16 °C and DO < 9.5 mg/L
Temperature > 16 °C and DO > 9.5 mg/L
Temperature > 16 °C and DO < 9.5 mg/L

Figure C5-3
FRFA Scenario 1 Future Condition Simulation, Model Segment 7:
Temperature and DO Conditions That Are Suitable for Salmonids in Summer Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C5–4

FRFA Scenario 1 Future Condition Simulation, Model Segment 5: Temperature and DO Conditions That Are Suitable for Salmonids in Summer Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

- Temperature < 16 °C and DO > 9.5 mg/L
- Temperature < 16 °C and DO < 9.5 mg/L
- Temperature > 16 °C and DO > 9.5 mg/L
- Temperature > 16 °C and DO < 9.5 mg/L
Figure C5–5

FRFA Scenario 1 Future Condition Simulation, Model Segment 4: Temperature and DO Conditions That Are Suitable for Salmonids in Summer

Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

Temperature < 16 °C and DO > 9.5 mg/L
Temperature < 16 °C and DO < 9.5 mg/L
Temperature > 16 °C and DO > 9.5 mg/L
Temperature > 16 °C and DO < 9.5 mg/L
Figure C5–6

FRFA Scenario 1 Future Condition Simulation, Model Segment 3:
Temperature and DO Conditions That Are Suitable for Salmonids in Summer Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

Legend:
- Temperature < 16 °C and DO > 9.5 mg/L
- Temperature < 16 °C and DO < 9.5 mg/L
- Temperature > 16 °C and DO > 9.5 mg/L
- Temperature > 16 °C and DO < 9.5 mg/L
Figure C5-7
FRFA Scenario 1 Future Condition Simulation,
Model Segment 2:
Temperature and DO Conditions That Are
Suitable for Salmonids in Summer
Reservoir Water Quality Model
Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

- Temperature < 16 °C and DO > 9.5 mg/L
- Temperature < 16 °C and DO < 9.5 mg/L
- Temperature > 16 °C and DO > 9.5 mg/L
- Temperature > 16 °C and DO < 9.5 mg/L
Figure C5–8

FRFA Scenario 1 Future Condition Simulation, Model Segment 15: Temperature and DO Conditions That Are Suitable for Salmonids in Summer Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C5–9

FRFA Scenario 1 Future Condition Simulation, Model Segment 14:
Temperature and DO Conditions That Are Suitable for Salmonids in Summer
Reservoir Water Quality Model

- Temperature < 16 °C and DO > 9.5 mg/L
- Temperature < 16 °C and DO < 9.5 mg/L
- Temperature > 16 °C and DO > 9.5 mg/L
- Temperature > 16 °C and DO < 9.5 mg/L

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat
Figure C5–10
FRFA Scenario 1 Future Condition Simulation, Model Segment 13: Temperature and DO Conditions That Are Suitable for Salmonids in Summer Reservoir Water Quality Model

Chehalis Basin Strategy: Reducing Flood Damage and Restoring Aquatic Species Habitat

Future Condition FRFA Scenario 1

Current Condition FRFA Scenario 1

Legend:
- Temperature < 16 °C and DO > 9.5 mg/L
- Temperature < 16 °C and DO < 9.5 mg/L
- Temperature > 16 °C and DO > 9.5 mg/L
- Temperature > 16 °C and DO < 9.5 mg/L