

Transboundary Dissolved Gas Workgroup System Modeling Subgroup

Working Group Status

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Working Group Members

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Objectives and Model Capabilities

- ◆ perform an integrated assessment of the impacts of total dissolved gas on the Columbia Basin ecosystem
- ◆ inform decision makers on the performance of operational and structural dissolved gas abatement alternatives in order to prioritize mitigation activities
- ◆ simulate the fate and transport of dissolved gas through the Columbia Basin system
- ◆ simulate ecological exposures and impacts

System Model: Scope and Scales

- ◆ Basin Wide
- ◆ Main Stems Only?
- ◆ Major Tributaries
- ◆ Resolution
 - 1 Mile, 1 Meter
 - Seconds
 - Hours
 - Days
 - Months



Data Requirements

- ◆ Bathymetry
- ◆ Hydrology
- ◆ Meteorology
- ◆ Project Operations
- ◆ Calibration and Verification
 - Hydrodynamics (Velocities and Depths)
 - Water Quality (Temperature, Dissolved Gas,..)

Project Gas Production Relationships

- ◆ Existing Project conditions
- ◆ Abatement alternatives
- ◆ Very Critical Information Need!!

Model Criteria

- ◆ Priorities for model use
 - TDG Prediction, Ecological Impacts
- ◆ Selection Criteria
- ◆ Model Reliability - Calibration/Verification
 - Data needs may be reduced if “higher” uncertainties can be accepted
- ◆ Output and Linkage Requirements
 - Select measures
 - linkage to other models or assessments
- ◆ Time and cost estimates

Biological Model Data Needs

- ◆ Fish longitudinal, lateral, and depth behaviour as a function of environmental physical parameters, fish species, size, population, and time.
- ◆ Exposure logs describing physical environment in terms of time, TGP, temperature, and barometric pressure as well as the status of the fish population in terms of depth and physiological condition of cardiovascular bubbles resulting from previous exposures to TGP and hydrostatic pressure..
- ◆ Laboratory data required to complete calibration and validation of DGBTM model.

Model Application

- ◆ Develop and perform a baseline system assessment
- ◆ Develop and perform gas abatement alternatives assessment
- ◆ Project specific analysis
- ◆ Uncertainty and risk analysis
- ◆ Time and cost estimates

Research Needs

- ◆ Mechanistic models of gas generation at structures, air/water gas exchange data for the Columbia and Snake rivers
- ◆ Mechanistic models of cardiovascular bubble growth and mortality in populations of fish
- ◆ Others?