Decision Support System Workshop

**Next Steps in DSS Development and Implementation**

J. Tyrell DeWeber

Oregon Cooperative Fish & Wildlife Research Unit
OVERVIEW OF DSS COMPONENTS

- Riparian Dynamics Models
  - Riparian Vegetation Response
- Channel/Floodplain Morphology
- Hydraulic Models
  - Fish Habitat Model
  - Herpetofauna Models
    - Herpetofauna Response
  - Healthy River Response
- Flow Release at Lewiston
- Gravel Augmentation
- Water Temperature Models
- Hatchery Input
- Hydrology Models
  - Fish Production Model
- Salmon Population Response
Utility of Current DSS

• Link flow schedules to:
  – Fish production, riparian and wildlife

• Support annual flow decision
  – Predicted outputs for different hydrographs
  – Focused on fundamental objectives
  – Transparent decision process
  – Repeatable process
Utility of Current DSS

• Framework for adaptive management
  – Compare predictions with monitoring

![Diagram showing predicted and observed data comparison]
Utility of Current DSS

• Framework for adaptive management
  – Compare predictions with monitoring
  – Compare alternative hypotheses
  – Learn and improve management

• Big step forward if implemented
Next Steps for DSS

- Need clearly defined objectives and performance metrics
  - Objective = something we care about
  - Performance metrics = clearly defined attributes of objectives

- Example: Natural fish production
  - Performance metric: Total abundance of naturally produced outmigrants
Next Steps for DSS

• Need clearly defined objectives and performance metrics

• What is a healthy river?
  – How do we describe it?
  – Bed mobility? Groundwater fluctuation?
  – Do we use biological endpoints?
    • Example: Riparian vegetation represents multiple processes

• What is needed to support decision?
Next Steps for DSS

Complete Development

• Some pieces aren’t developed yet
  – Should the DSS be expanded to include other attributes?

• Current focus on flows and gravel
  – Should other management actions be included?
OVERVIEW OF DSS COMPONENTS

Riparian Dynamics Models
  Riparian Vegetation Response
  Channel/Floodplain Morphology
  Hydraulic Models
    Fish Habitat Model
    Herpetofauna Models
      Herpetofauna Response
      Healthy River Response

Gravel Augmentation
Flow Release at Lewiston
Hydrology Models
  Water Temperature Models

Fish Production Model
Salmon Population Response
Hatchery Input
OVERVIEW OF DSS COMPONENTS

Notes:
Arrows represent the flow of information
- Orange: Represents management action inputs to the DSS
- Blue: Represents component models
- Green: Represents outputs from the DSS

Components:
- Fine Sediment Reduction
- Channel Modifications
- Gravel Augmentation
- Large Wood Augmentation
- Flow Release at Lewiston
- Hatchery Input

Models:
- Riparian Dynamics Models
- Fluvial Geomorphic Models
- Water Temperature Models
- Available Fish Habitat
- Fish Population Dynamics Model
- Healthy River Response
- Herpetofauna and Avian Models
- Aquatic Productivity Response
- Salmon Population Response
Next Steps for DSS

Develop influence diagrams
  • Clearly show flow of information and relationships
  • Makes probability based modeling more feasible
  • Helps guide sensitivity analysis and monitoring
Hydrograph Selection

Current channel

SRH-2D Hydraulic

Future River Temp.

Tributary Flows/Precip

Lewiston temp.

Air temp.

Temperature: RBM10

River flows

Current channel

Large wood

Fish habitat

Fish habitat

Fish Production

Current spawners

Hydrologic

SSS Fish Production
Next Steps for DSS

• Develop DSS output format
  – Ex: Should outputs be numeric, figures, etc.?  
  – Requires input from TMC and TAMWG

• Build DSS structure
  – Currently models run in multiple places
  – Time intensive to get outputs
  – Can probably link all in a web tool
Next Steps for DSS

• Sensitivity Analyses
  – Identify important pieces that influence decisions
  – Focus additional monitoring efforts

• Adaptive management
  – Link monitoring data to predictions
  – Demonstrate how learning can occur
  – Develop alternative hypotheses
Next Steps for DSS

Questions or Additional thoughts?