

Flow Management Research Priorities: Natural Flow Paradigm

Background

- Global move to embrace the natural flow paradigm as the guiding principle for river management and restoration.
- Modeling tools and assessment frameworks are being developed with this concept in mind.
- The natural flow paradigm identified as a research priority for the DFO and the CEA (St. John's workshop, June 2004).
- DFO/CEA 'team' tasked with further scoping of this issue.

Scoping 'Teams'

- **Natural Flow Paradigm**
 - Dave Scruton, DFO NL
Lead
 - Marie Gaulin, DFO
Québec
 - Simon Trepanier, DFO
Québec
 - Paul Higgins, BC Hydro
 - Chris Katopodis, DFO
C&A
 - Greg Pope, OPG
- **Flow Assessment Framework**
 - Michel Bérubé, Hydro-Québec
Lead
 - Ed DeBruyn, DFO C&A
 - Marie Gaulin, DFO Québec
 - Ken Meade, NS Power
 - Dave Scruton, DFO NL
 - Hugh Smith, BC Hydro
 - Terry Toner, NS Power

Considerations:

- What are the various issues, knowledge gaps, etc. within the natural flow paradigm that are the most important to the utilities and the DFO?
- What are the types of projects, studies, etc. that are needed to address these issues/knowledge gaps?
- What would be the reasonable scope of these projects?
- Who should undertake this work (utilities, DFO science, consultants, academia, etc.)?
- What are the most important and logical first steps?

Large Scale Questions:

- Key elements of a natural hydrograph and its variability in areas subject to hydroelectric development;
- Linkages between key elements of the hydrograph and key species and life stages;
- Linkages between key elements of the hydrograph and river geomorphology and other ecological characteristics;
- Characteristics of hydrological events and their importance to biological function;
- Appropriate data needs and metrics to measure the relationships between river hydrograph and fish/habitat, in both natural and regulated systems; and
- How can the natural flow paradigm concept be captured/represented in habitat hydraulic models and assessment frameworks.

Issues:

- Very broad topic, need practical achievable deliverable.
- Geographic, climatic, and inter-watershed variability relationships between biota and natural hydrograph – can these be realistically generalized
 - Ecosystem indicators?
 - Regional case studies?
- Application of the NFP concept in watersheds of different magnitude (scaling)
- Incorporating broader resource management considerations
 - Socio-economics?
 - Holistic approach?
 - Trade offs?

Issues:

- Including the natural flow paradigm concept into Assessment/Modeling Frameworks (WUP?)
- Assessing and considering flow management needs/variability on a population/community basis.
- Research topics must have management application.
- Role and involvement of provincial interests/agencies?
- Mitigation and compensation alternatives where the NFP concepts cannot be met.

First Steps?

- Literature review from the perspective of the DFO and CEA in a Canadian context
 - Understanding and definition of concept
 - Knowledge gaps
 - Uncertainty and precision related to issues
- Validation through use of existing data – compare fisheries/ecological data from regulated and natural systems
 - Fish population response/adaptation to regulation
 - Physical and geo-morphological response (fish habitat?)
- Wherever possible build on existing knowledge, studies, facilities, research strengths, etc.

First Steps?

- Studies would best be conducted by a partnership involving DFO and the utilities with academic partnerships where beneficial.
- Many issues/studies will multidisciplinary in nature.
- Need for transparency and stakeholder involvement.
- Objectives clear and relevant to both science and management.