

BC Hydro Generation

Sustainability Programs Generation for Generations

June 2005

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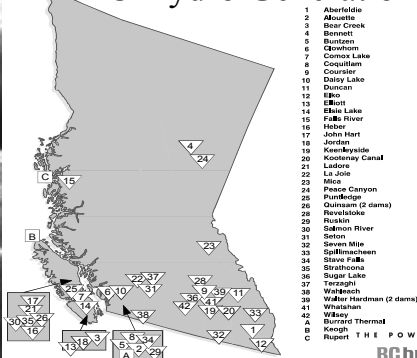
BC Hydro Generation

- Provincial Crown Corporation
- Third largest utility in Canada
- Supplier of electricity for 94% of BC customers
- TBL focused organization
- Water rental fees and dividend to province
- 32 hydro plants and three thermal facilities
- 11,300 MW capacity - 90% as hydro
- Energy trading (net importer)

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BC Hydro Dams and Generating Stations

BC Hydro Generation



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Social and Environmental Issues

- Prior to 1990's BC Hydro approached sustainability issues as legal compliance
- Various footprint and operating concerns brought to the utility by public, agency and First Nations
- Responses were expensive, single objective driven with limited focus on integrated planning
- BC Hydro foresaw conflicts, erosion in benefits and escalation of legal action through reactive approach

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Historic Environmental Issues

- Fisheries concerns
 - Fish passage and entrainment
 - Seasonal flow supplementation
 - Ramping and load following
 - Outage response
 - Spilling and fish salvage operations
 - Water quality (TGP, TSS and nutrients)
 - Reservoir elevations and productivity
 - Substrate erosion and armoring

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Other Historic Concerns

- Recreation and public safety (18 public use sites)
- Flood routing concerns
- Property erosion on reservoirs
- Archaeological issues and Heritage Sites
- Navigation/transportation
- Industrial infrastructure
- Domestic water sources
- Wildlife
- Riparian vegetation

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Environmental Solutions

- Proactive approach through:
 - Fish and wildlife restoration and compensation programs
 - Fish passage improvements
 - Water Use Planning (integrated resource planning with agencies, First Nations and agencies)
 - Entrainment strategy
 - Recovery planning
 - Footprint analysis to set long term targets

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Compensation and Restoration

- 1989 Peace Fish and Wildlife perpetual program
- Followed by Columbia and Bridge Coastal F&W Compensation/Restoration programs
- \$7 million / yr. in perpetuity for habitat and stock production improvements through agency, First Nation and public committees and boards
- Projects include:
 - large reservoir fertilization to increase productivity
 - fish passage
 - Habitat assessment and improvement

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Fish Passage

- First priority was improve downstream passage at facilities with upstream passage (anadromous)
- Research on behavioral devices (sound, light, electrical and physical)
- Puntledge Eicher penstock screen
- Salmon R. screen improvements
- Seton louvers
- Future improvements will rely on restoration programs and plant upgrade opportunities

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Operational Solutions

- 1994 fish flow overview and associated studies
- 1995 fish strategy; to work in collaboration with our stakeholders (Integrated Management)
- 1998 Provincial Water Use Plan Guidelines and shareholder agreement (\$50 million/yr.)
- 1999 Implemented a 5 yr. plan for 23 water use plans for 31 hydro facilities
- Currently 23 plans complete and being approved for implementation

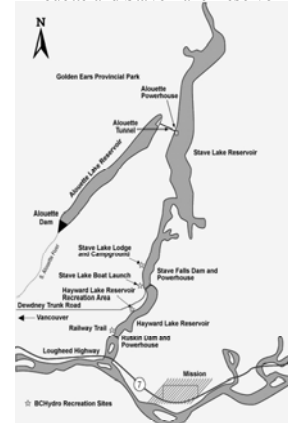
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Stave River Water Use Plan Finding a New Balance



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Alouette and Stave Lake Reservoir



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Stave Historic Issues

- Load following and habitat stranding
- Long term habitat degradation
- Recreation
- Cultural site protection and access
- Reservoir access for cedar blocks
- Log sorting in lower river
- Riparian and littoral zone productivity

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Stave WUP Process

- 13 step WUP process
- Initiate, scope issues and determine consultation
- Define objectives and gather information
- Define operating alternatives - assess tradeoffs
- Document process findings (consensus?)
- Prepare and submit plan
- Plan reviewed and authorized
- Implementation and monitoring
- Review

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Stave River Water Use Plan

What's Included?

- Recommended facility operations
 - reservoir levels
 - minimum flows
- Physical “works” when they provide the same benefits as operating changes, but at lower cost
- Studies/monitoring to improve future operating decisions
- Review period

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Stave River Water Use Plan

Process - Key Aspects

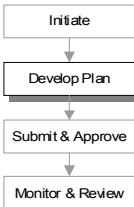
- Structured decision process
- Use of objectives/performance measures
- Studies directly relate to P.M. to improve operating decisions
- Alternative operations modeling
- Document Areas of Agreement, Disagreement
- Consensus a goal but not essential

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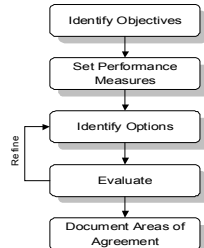
Stave River Water Use Plan

WUP Process

WUP Process



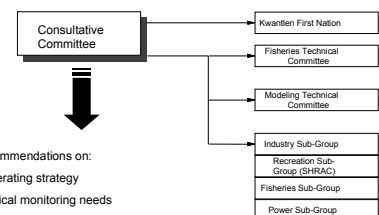
Trade-Off Analysis



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Stave River Water Use Plan

SRWUP Consultative Committee



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Consensus agreement reached with gains across all interests, including:

- fish/wildlife habitat
- recreation
- electricity production
- industry
- cultural/heritage site management

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Entrainment Strategy

- Entrainment not generally resolved through WUP process
- Recognized the need for a structured process
- Initiated system overview in 2004
- Working on priority facilities to define needs and alternatives

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Footprint Analysis

- Goal “no new net environmental impact”
- 20 year planning horizon
- Define initial and current impacts
- Forecast future impacts
- Determine annual targets for programs

“Generation For Generations”

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