The Alaska Hydrokinetic Energy Research Center

J. Kasper

http://acep.uaf.edu/programs/alaska-hydrokinetic-energy-research-center.aspx

Photo by Todd Paris, UAF

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Supporting Alaskan Economic Development

Emerging technologies such as hydrokinetics are economically competitive in Alaska.

Alaska is at the forefront of adopting new energy technologies:
- Difficult to extract/transport fossil fuels
- State support

Knowledge gained is exportable to other developing economies.

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Permitted Site for Hydrokinetic Research and Testing in Natural Alaskan River Conditions

Complete site characterization
- Hydrodynamic measurement & modeling
  - Discharge, velocity, sediment, turbulence
- Fish populations
- Debris (size, type, frequency, location)

Technology development and testing
- Debris modeling and mitigation
- Mobil measurement and test platform
  - Yakutat wave resource assessment
- River energy converter testing
  - Fish interaction monitoring
- Infrastructure anchoring, deployment and operation in remote communities with islanded grids

Power density
- Low to Medium Power Density
  - Increased Turbulence
- Best Location to Capture Hydrokinetic Energy
  - High Power Density
  - Increased KE
- Low TKE
  - TKE/KE = 2%*
  - At transect 1100
- Reduced Power Density
  - Reduced KE
  - High TKE
  - TKE/KE = 30%
- High Power Density
  - High KE
  - High TKE
  - TKE/KE = 15%

July 2010
(Q = 1,784 m³/s)

(Modified from Duvoy and Toniolo, 2012)
Debris Mitigation

Interaction

Characterization

Mitigation Technology

Technology Testing

Debris Mitigation
Debris Mitigation Technology Testing and Modeling

RDDP debris diversion test

RDDP/debris interaction

Time: 0.000s
Turbine Test at the Tanana River Test Site

Turbine Test Platform and RDDP

Oceana Turbine Testing
Mobile Monitoring and Assessments Capabilities: Yakutat Wave Energy Resource Assessment
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