

**Texas A & M University and U.S. Bureau of Reclamation**  
**Hydrologic Modeling Inventory**  
**Model Description Form**  
**July 18, 2007**

**Name of Model: Hydrological River Basin Environment Assessment Model**

**Model Type: Distributed Runoff Model with Water Quality and Ecosystem**

**Model Objective(s):** i) Physical-based runoff model (kinematic wave, heat balance and others)  
ii) Distributed runoff model by using DEM and GIS  
iii) Calculation of water quantity, quality (including endocrine disruptor) and ecosystem for environment assessment

**Agency and Office: Water Resources Research Center, Disaster Prevention Research Institute, Kyoto University**

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**Model Structure or Mathematical Basis:**

- i) Physical-based runoff model (kinematic wave, heat balance and others)
- ii) Multi-layer for groundwater
- iii) Distributed runoff with multi-mesh by using DEM and GIS
- iii) Water quantity, quality (including endocrine disruptor) and ecosystem (PBPK)

**Model Parameters: Monitored parameters and identified parameters for simulation**

**Spatial Scale Employed in the Model: 1km to 30km**

**Temporal Scale Employed in the Model: 1 hour to 1 day**

**Input Data Requirements: User can select simple one according to the situation.**

**Meteorological data (air pressure, air temperature, and others)**

**Hydrological data (precipitation, snow depth, wind, and others)**

**Hydraulics data (roughness, channel structure, and others)**

**Environmental data (emission, population, purification, and others)**

**Topological data (Digital Elevation Map)**

**Land use data (Mountain, Field, Farm, Water, City and others)**

**Computer Requirements: It depends on the scales**

**Minimum requirements for 2000 meshes in computer capacities**

**CPU memory - 3 GB**

**Hard Disk- 1 MB for program**

**Hard Disk- 1GB for calculation**

**FORTRAN (VISUAL FORTRAN)**

**Model Output: FORTRAN style**

**Text, dat, binary data**

**Output is passed to a visual tool.**

**Parameter Estimation / Model Calibration:**

**Manual**

**Model Testing and Verification:**

**Manual**

**Model Sensitivity: Manual**

**Model Reliability: High (more than 0.9)**

**Model Application / Case Studies:**

**Many rivers in Japan (The Tone River, The Shonai River, The Nagara River, The Gokase River, The Yodo River and others)**

**Some rivers in the world (The Pioneer River in Australia, The Yellow River in China, The Geumho River in Korea and others)**

**Documentation:**

**HydroBEAM Manual in Japanese**

**English manual is under printing**

**Other Comments:**

**As this model was developed to investigate the environment assessment, the population of aqua creature can be analyzed and the impact of endocrine disruptor is also estimated including with water quality, toxic-chemical and ecosystem (PBPK) models. Moreover, the countermeasure process is linked with the optimal planning to modify the worst point (area) through the genetic algorithm approach.**

Please see the HMI web page: <http://www.usbr.gov/hmi>

Forms are available in Text file, HTML, MS Word and WordPerfect formats

This effort is being conducted by River Systems & Meteorology Group: <http://www.usbr.gov/rsmg>