CGAP

Model Uses CGAP allows for the analysis, interpretation and quantification of properties associated with open channels.

Major Categories Geomorphology

Minor Categories Channel Classification

Model Type Physical Model

Subject Knowledge Level
Intermediate

Technical Difficulty Level
Intermediate

Geographic in Nature?
No

Abstract
CGAP allows for the analysis, interpretation, and quantification of the physical properties of an open-channel reach as defined by a sequence of cross sections. The primary function of the program is to compute the area, width, wetted perimeter, and hydraulic radius of cross sections at successive increments of water-surface elevation (stage) from data that consist of coordinate pairs of cross-channel distances and land-surface or channel-bottom elevations. Longitudinal rates-of-change of cross-sectional properties are also computed. In addition, the mean properties (including discharge as computed using the Manning's equation) of a channel reach and the cross-sectional area and channel widths as functions of stage for subdivisions of a cross section can be computed. CGAP was developed to compute, display, and otherwise format cross-sectional data for use with simulation models. CGAP produces files of data in the required input format for BRANCH and HSPF (the latter after use of the program genftbl--generate F-Table--provided with CGAP).

Future Developments
Unknown

Model Limitations
Unknown

Model Features

- Can be used to create input files for BRANCH or HSPF models.
- Includes a sub-routine program known as 'genftbl' (Generate F-Table) that allows for the data conversion required by HSPF.

Required Data Types
Input data consists of land-surface or channel-bottom elevations measured and referenced horizontally to a channel-bank location and referenced vertically to a common datum. These data should be measured along a line normal to the flow direction at the thalweg of the channel. Sufficient number of points must be obtained so that linear interpolation between points accurately describes the cross-sectional properties at all possible stages of flow. A minimum of two data points below and a single channel must be present at the minimum elevation of interest in order for CGAP to perform computations. Other input data include datum adjustments, segment lengths, skew angles, and program-control parameters, such as output options, stage range of computations, computation increment, and plot scaling factors. Input is expected in the inch-pound system of

Model Outputs
The program provides 16 output options that format the input cross-sectional data or the computed cross-sectional properties as digital plots, line-printer plots, tabular lists, and (or) sequential files. These output formats include: plots of cross sections; plots of cross-sectional area and (or) channel width as functions of stage; tabular lists of computed, stage-dependent, cross-sectional properties (area, width, wetted perimeter, hydraulic radius, average depth, and symmetry); files of computed cross-sectional properties; plots of cross sections in isometric projection; plots of cross-sectional area at fixed stage as a function of longitudinal distance along an open-channel reach; files of computed cross-sectional area as a function of stage for subdivisions of a cross section; and files of computed discharge, area, top width, and conveyance as functions of stage for mean groups of one or more cross sections.

units.

Output is in the inch-pound system of units. The graphical output is dependent on the capabilities of the graphics library linked with the program (either GKS or CalComp compatible).

Will produce files in the appropriate format type for BRANCH or HSPF models.

Hardware Requirements
386 or better processor;

At least 4mb RAM

Supported Platforms

DOS	☒	**UNIX**	☒
Windows	☐	**Macintosh**	☐

Software Requirements
None Required.

Cost, Licensing and Availability
Model is offered free of charge from link provided.

Source
USGS

Source (URL)
http://water.usgs.gov/software/cgap.html