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CURRENT SCENARIO ON MODELS IN WATER RESOURCES MANAGEMENT

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ABSTRACT:

Water Resources Management case is reviewed here to develop and access model like those made for pollutant. This paper reviews both water resources management strategies and models that have been extensively used also the applicability and limitations of the models are addressed. Finally, current advances and challenges in regional model for water resources management are presented.

Keywords: management, strategies, models, challenges.

I. Introduction:

Resource management is being the essential task, as we know Rain, snow, hail and sleet are Natural resources water precipitated upon the surface of the earth as the original source of all the water supplied. Surface water accumulates mainly as a result of direct runoff from precipitation. Precipitation that does not enter the ground through penetration or is not returned to the atmosphere by evaporation, flows over the ground surface and is classified as direct runoff.

Part of the precipitation that falls infiltrates the soil. This water replenishes the soil moisture,
or is used by growing plants and returned to the atmosphere by transpiration. Water that percolates downward below the root zone finally reaches a level at which all the openings or voids in the earth's materials are filled with water. [1]

A Model is representation of a system so it should be necessarily a simplification of the system and it would not be possible to construct a model that's value as an analytical tool lies in its capability to decrease the number of factors to be measured to a convenient amount, selecting the most important connections in a system having insignificant property. The flow of a river is three dimensional the stream moves and pollutants are dispersed in all directions. It is frequently compound to symbolize three-dimensional pollutant move; most river models are designed to describe the transport of pollutants in only one direction. Predicting the concentration of pollutants at a location far at a drinking water intake pipe. The model checking and validation is always performed to make the most correct predication. In case Water Resources Management To determine model assumptions like those made for pollutant transport are valid and model results are tested against actual measurements. As an example, if the models estimate of the time of arrival and the concentration of pollutants at the downstream intake pipe is close to the concentration actually measured at that time, it would appear that it is valid to make these assumptions at these conditions. In validating a model, usually the model is compared with actual measurements under a variety of conditions. [2]

There is also need of management of pollutants in water reservoir such as many different types of contaminants can pollute water and render it unusable. Radionuclides including uranium and radium These pollutants come from a wide range of sources. Some inorganic contaminants such as arsenic and radionuclides such as uranium occur naturally in geologic deposits, but many inorganic and most major organic pollutants are emitted from industrial facilities, mining, and agricultural activities such as fertilizer and pesticide application Microorganisms such as cryptosporidium, giardia, and fecal coliform bacteria Disinfectants and water disinfection byproducts including chlorine, bromate, and chlorite Inorganic chemicals such as arsenic, cadmium, lead, and mercury Organic chemicals such as benzene, dioxin, and vinyl chloride[3] Microorganisms are typically found in human and animal waste. Sediments (soil particles) from erosion and activities such as excavation and construction also pollute rivers, lakes, and coastal waters. so adding sediments can severely affect productivity in these ecosystems by clouding the water. It also smothers fish and shellfish spawning grounds and degrades habitat by filling in rivers and streams. The costs to industry of pollution control can also have economic implications that affect such factors as industry location and national inflation levels. Models are used to determine the impacts of these costs on economic indicators like the Consumer Price Index and the gross national product, as well as to determine the impact of these costs on specific industries. Various models have been given on role of pollutants on water management.

II. Review of Literature:

Most complex ground water models are documented by reports, user’s manuals, and papers devoted specifically to a particular model.

However, several books have been published which provide and document relatively simple computer codes as well as discuss various aspects of ground water modeling. The computer programs are furnished on diskettes accompanying the books or are available upon request. Clarke [4] provides a collection of microcomputer programs and subroutines, coded in BASIC, which cover a variety of computations involved in modeling ground water flow. Helweg [5] provides several relatively simple programs, written in BASIC, for pump tests and pump selection. Bonn and Rounds [6] published an 83 program, called DREAM, which contains several routines for analytical solutions of relatively simple groundwater flow problems. Aral [7] provides the Steady Layered Aquifer Model (SLAM) FORTRAN computer program. Walton [8] distributes four programs, coded in BASIC, called WELFUN, WELFLD, CONMIG, and GWGRAF, which provide analytical solutions to ground water flow and contaminant migration problems. Walton [9] presents two numerical flow and contamination microcomputer programs, called GWFL3D and GWTR3D, which are modifications and extensions of the PLASM and RANDOM WALK models cited later in this chapter. Walton [10] provides a tutorial and reference guide for applying MODFLOW, MODPATH, MODPATH-PLOT, MOC, SUTRA, INTERTRANS, INTERSAT, and GEOPACK. PLASM. The Prickett-Lonnquist Aquifer Simulation Model (PLASM) was one of the first readily available, well-documented ground water flow models. The original model developed by the Illinois State Water Survey [11] has been updated to a user-friendly format for execution on IBM-compatible microcomputers.

III. Progress and challenges:

As seen so far models can also be used as Predictive tools. In case of a river, dissolved oxygen levels depend to a large degree on levels of bacterial activity, because as organic matter bacterially decomposes, the bacteria consume dissolved oxygen. The number of other factors on which Dissolved oxygen concentrations depends are the exchange of oxygen between the river and the atmosphere, algal photosynthesis and respiration, temperature, sunlight, and many other interactions. Experiments to determine the straight effects of pollution on dissolved oxygen levels would need inducing many unlike levels of pollution into the river, attempting to keep all the other factors constant, and measuring the result. If a model is found to be a logical representation of the real system, it can give out a number of functions. Primarily it can be used descriptively to aid analysts in understanding how the real system works. As a case when a landfill leaks pollutants into ground water reserves, a model can be used to give you an idea about how distant the contamination has broaden, and to estimate pollution levels in a given region. The model gives the quickest warning of the extent and importance of the problem such as time-consuming drilling of test wells and to determine the probable location of the most contaminated sites. The trials would be time consuming, costly, and difficult to control also, it may be extremely undesirable to run such an experiment in the real world. The models can also be used to determine what levels of sewage treatment will be required for gathering water quality standards before a sewage treatment plant is built. These models might be used to control the operation of a sewage treatment plant or to regulate water flows through a system of reservoirs within a river basin. Planning models might be used to evaluate alternatives for future expansion of a treatment plant or to study the impact of the proposed development of a water-consuming industry along a river or stream. Models that support planning activities are often broader in scope than operations and management models. Some models are developed solely for data management- organizing and accessing data. These models usually are supported by extensive monitoring and reporting networks, and may include data for a wide range of water-related issues. Models for regulation are those used in direct support of enforcement or promulgation of standards or in the issuance of permits. As an example, a regulation model might be used to determine the allowable discharge level for a sewage treatment facility prior to the issuance of a permit for facility expansion [12-14]

IV. References :

1. http://www.kmwsa.gov.in/o-m_manual/Chapter-3.pdf
2. John Andelin , Robert W, Niblock , *Use of Models for Water Resources Management, Planning, and Policy*, August 1982, NTIS order #PB83-103655
3. http://www.learner.org/courses/envsci/unit/text.php?unit=8&secNum=8
4. Clarke, D., Microcomputer Programs for Groundwater Studies, Developments in Water Science Series, No. 30, Elsevier Science Publishers, 1987.
5. Helweg, O.J., Microcomputer Applications in Water Resources, Prentice Hall, 1991.
6. Bonn, B., and S. Rounds, DREAM: Analytical Groundwater Flow Programs, Lewis Publishers, Chelsea, Michigan, 1990.
7. Aral, M.M., Ground Water Modeling in Multilayer Aquifers, Lewis Publishers, Chelsea, Michigan, 1990.
8. Walton, W.C., Analytical Groundwater Modeling, Flow and Contaminant Migration, Lewis Publishers, Chelsea, Michigan, 1989.
9. Walton, W.C., Numerical Groundwater Modeling, Flow and Contaminant Migration, Lewis Publishers, Chelsea, Michigan, 1989.
10. Walton, W.C., Groundwater Modeling Utilities, Lewis Publishers, 1992.
11. Prickett, T.A., and C.G. Lonnquist, "Selected Digital Computer Techniques for Groundwater Resource Evaluation," Bulletin 55, Illinois State Water Survey, Urbana, Illinois, 1971.
12. Ximing Cai, Claudia Ringler, Mark W. Rosegrant 'Modeling Water Resources Management at the Basin Level Methodology and Application to the Maipo River Basin' research report 149 international food policy research institute Washington.
13. Liston, G. E., Sud, Y. C., and Wood, E. F., 1994, 'Evaluating GCM land surface hydrology parameterisations by computing river discharges using a runoff routing model: Application to the Mississippi Basin', J. Appl. Meteorol. 33, 394–404.
14. Ewen, J. and Parkin, G., 1996, 'Validation of catchment models for predicting land-use and climate change impacts 1: Method', J. Hydrol. 175, 583–594.