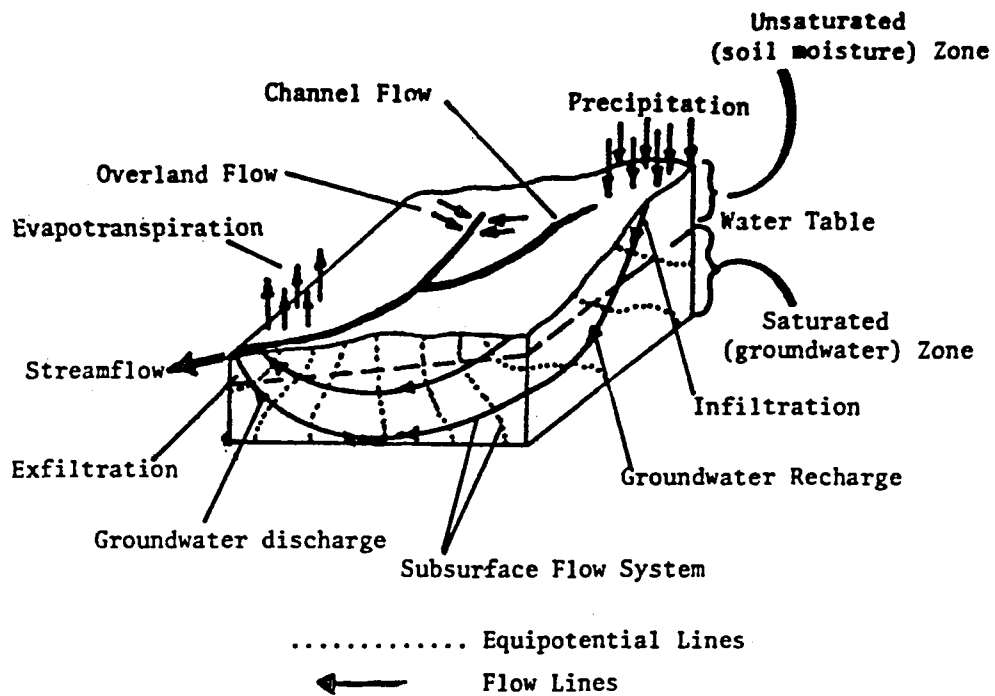


HYDROLOGY TEAM
PRESENTED BY: ROBERT RAGAN

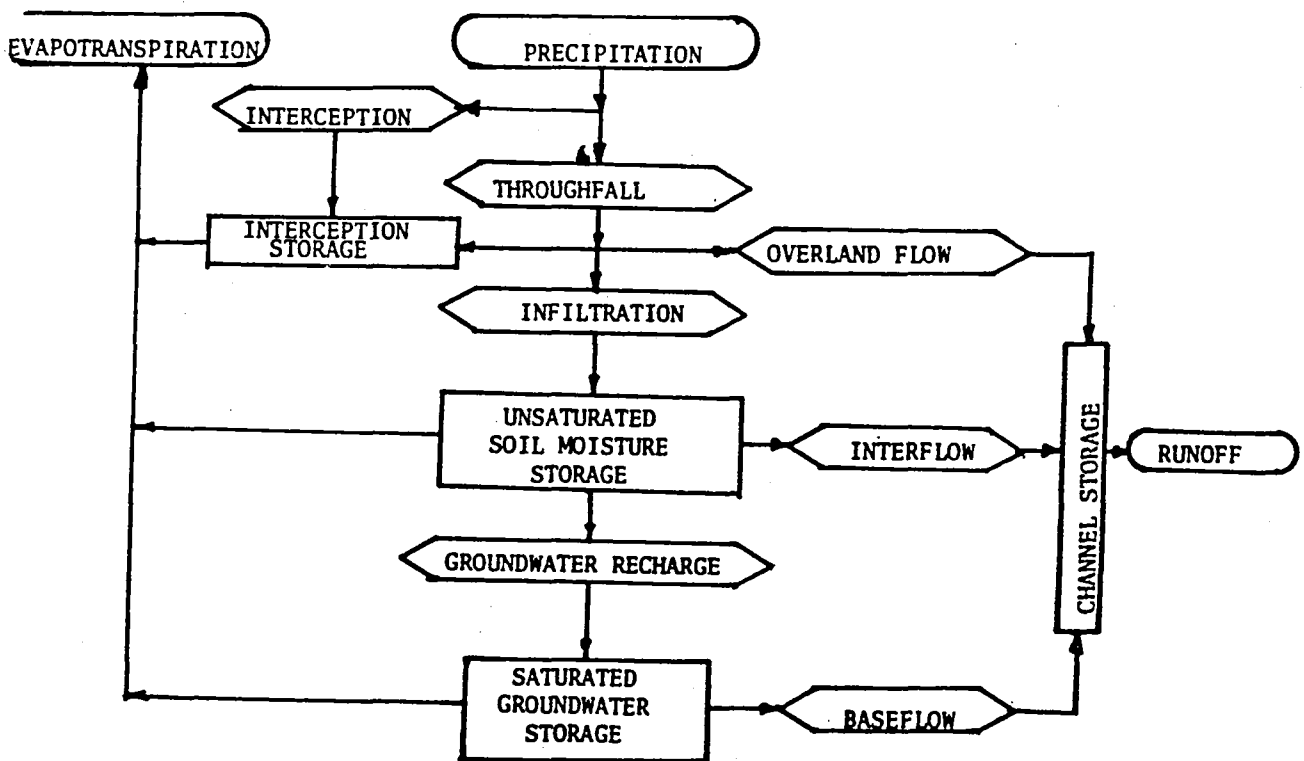
THE DEVELOPMENT AND MANAGEMENT OF HIGH QUALITY HUMAN
HABITATION ON A TERRESTRIAL SCALE IS CONTINGENT ON THE
RESOLUTION OF INCREASINGLY COMPLEX ISSUES RELATED TO THE
DEVELOPMENT AND MANAGEMENT OF A LIMITED WATER RESOURCE.

HYDROLOGY

- HYDROLOGY IS AN EARTH SCIENCE CONCERNED WITH THE OCCURRENCE, DISTRIBUTION, MOVEMENT, AND PROPERTIES OF THE WATERS OF THE EARTH AND THEIR ENVIRONMENTAL RELATIONSHIPS.
- THE HYDROLOGIST MUST PROVIDE QUANTITATIVE INFORMATION ON THE TEMPORAL/SPATIAL DISTRIBUTION OF WATER FOR THE PLANNING, DESIGN AND OPERATIONS/MANAGEMENT DECISION MAKING PROCESSES USING:
 - HISTORICAL RECORDS
 - REAL TIME DATA
 - STATISTICAL ANALYSIS
 - SYSTEM SIMULATION



HYDROLOGIC PROCESSES IN A WATERSHED



TYPICAL HYDROLOGIC MODEL STRUCTURE

● MISSION AREAS: MUNICIPAL/INDUSTRIAL WATER SUPPLY

IRRIGATION

FLOOD/DROUGHT CONTROL

QUALITY MAINTENANCE

ENERGY

RECREATION

● PROCESSES: PRECIPITATION

SNOW PACK

SOIL MOISTURE

SURFACE STORAGE

GROUNDWATER

EVAPO-TRANSPIRATION

STREAMFLOW

GENERAL PROBLEMS

- CURRENT INFORMATION GATHERING TECHNIQUES PROVIDE VERY LIMITED DEFINITION OF THE SYSTEM
- SIMULATION MODELS ARE DELIBERATELY DESIGNED TO USE LIMITED DATA
- SPATIAL/TEMPORAL DEFINITION IS EXTREMELY LIMITED
- ABILITY TO DEFINE THE STATE OF INDIVIDUAL PROCESSES IS LIMITED
- MODELS DO NOT REFLECT STATE OF THE ART KNOWLEDGE BECAUSE OF DATA DEFINITION PROBLEMS

MAJOR PROBLEM AREAS REQUIRING
MULTISPECTRAL IMAGING-BASED
RESEARCH TO ADVANCE SCIENCE

- A ● DEFINITION OF SPATIALLY DISTRIBUTED EVAPOTRANSPIRATION RATES FOR LARGE AREAS
- E ● FLOODING DYNAMICS OF WETLANDS
- A ● DEFINITION OF TEMPORAL/SPATIAL DISTRIBUTION OF SOIL MOISTURE DYNAMICS IN LARGE AREAS
- B ● DETERMINATION OF SNOW WATER EQUIVALENT
- G ● DEFINITION OF RUNOFF AND SEDIMENT YIELD FROM UNGAGED WATERSHEDS
- A ● DETERMINATION OF SPATIAL/TEMPORAL DISTRIBUTIONS OF STORM RAINFALL
- C ● RELATIONSHIP BETWEEN REMOTELY MEASURED SURFACE ROUGHNESS AND HYDRAULIC ROUGHNESS OF LAND SURFACES AND STREAM NETWORKS
- C ● DEFINITION OF HYDROLOGIC PROPERTIES OF SOILS AND SURFICIAL MATERIALS
- D ● INTERPRETATION OF ACTIVE/PASSIVE MEASUREMENTS OF FLOURSCENCE AND POLARIZATION OF WATER AND ITS CONTAINED SUBSTANCES
- D ● DETERMINATION AND MODELING OF THREE DIMENSIONAL CHARACTERISTICS OF WATER BODIES
- C ● INTERPRETATION OF SPECTRAL EMISSIVITY OF LAND AND WATER SURFACES
- C ● DETERMINATION OF THE RELATIONSHIP BETWEEN TEXTURE OF TERRAIN AND THE HYDROLOGIC RESPONSE OF WATERSHEDS
- D ● DISCRIMINATION BETWEEN SEDIMENT AND CHLOROPHYLL IN WATER
- C ● IMPROVING THE DETERMINATION OF HYDROLOGIC LAND COVER AS RELATED TO THE MODELING OF THE RUNOFF PROCESSES
- A ● IMPROVING IRRIGATION MANAGEMENT STRATEGIES
- F ● ROLE OF BARRIER ISLAND DYNAMICS IN COASTAL ZONE PROCESSES

A. Water Balance Problems Centering on Surface/Atmosphere Interfoces

B Unique Problem Area

C. Basin Physiography

D. Water Quality

E & F Unique Problem Areas

G. Objective of A-E is to provide scientific base to allow significant improvement in modeling