Evaluating the Efficacy of the Edwards Aquifer Protection Program

Meeting of the City of San Antonio
Conservation Advisory Board
May 26, 2021

F. Paul Bertetti, P.G.
Director – Aquifer Science

It is important to quantitatively assess the EAPP

- Represents a large investment of local resources
- Continued high interest and support from the public
- Need to be able to provide estimates of past effectiveness and future investment

- Some previous efforts to assess the program have lacked strong technical bases for conclusions

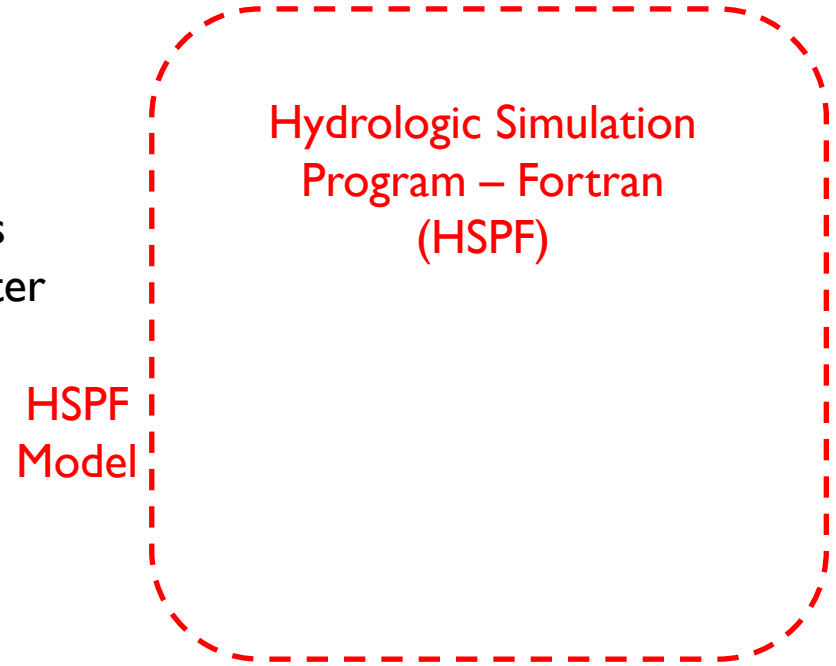
A new approach

- SwRI and EAA have developed a proposed assessment methodology that can address some of the deficiencies of previous efforts to quantify the effectiveness the EAPP

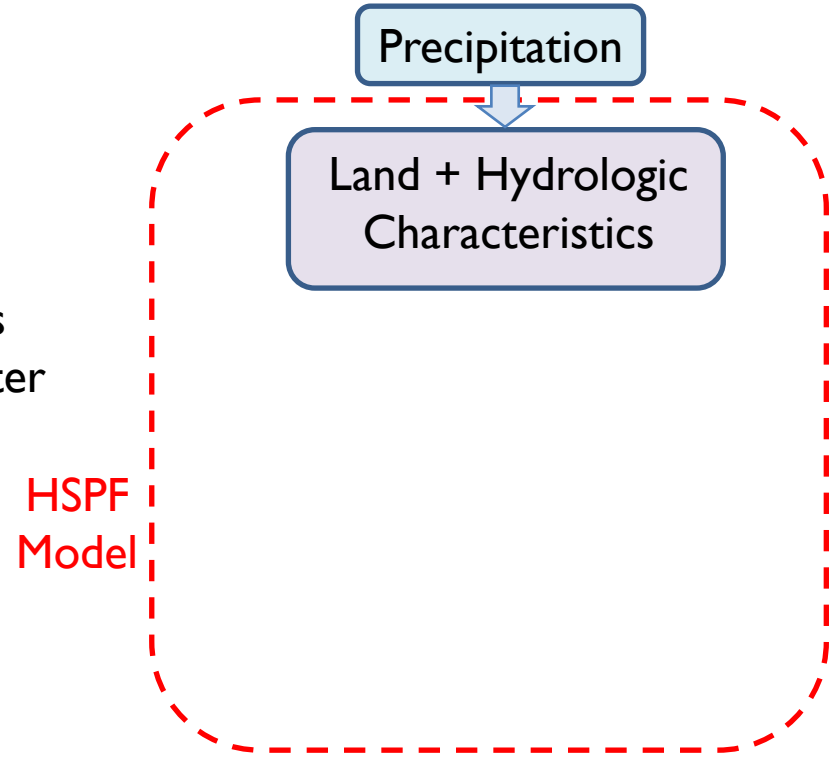
SwRI: Kindra Nicholaides, Gordon Wittmeyer, Ph.D., Ronald Green, Ph.D., P.G.

- Uses a geographic information systems (GIS) tool that is informed by existing watershed models
- Leverages knowledge from coupled groundwater-surface water modeling in the region

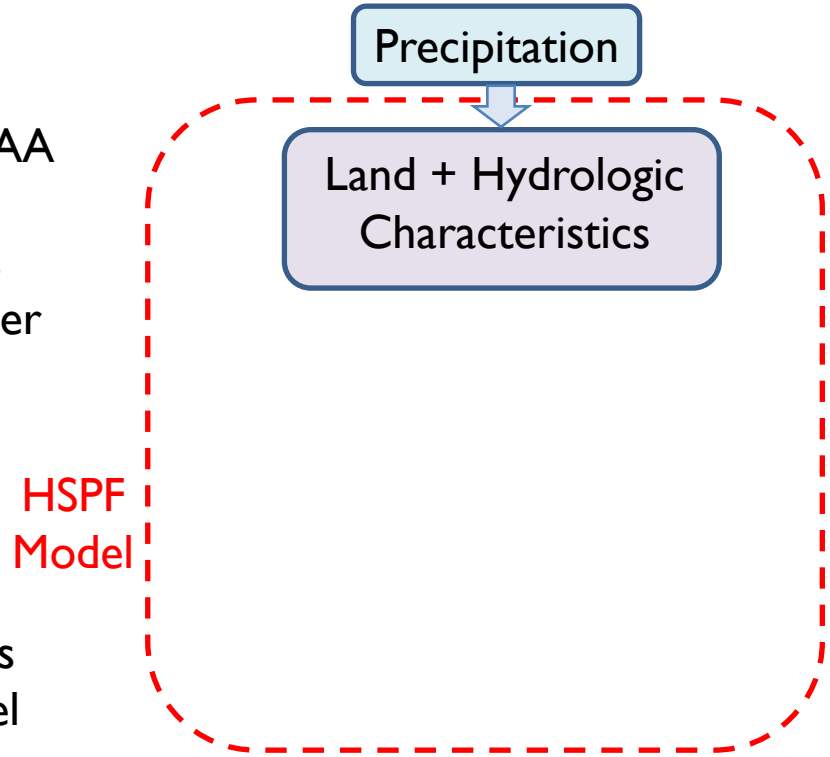
A watershed model previously funded and developed by EAA to evaluate alternative recharge calculations is used to generate a water balance



A watershed model previously funded and developed by EAA to evaluate alternative recharge calculations is used to generate a water balance

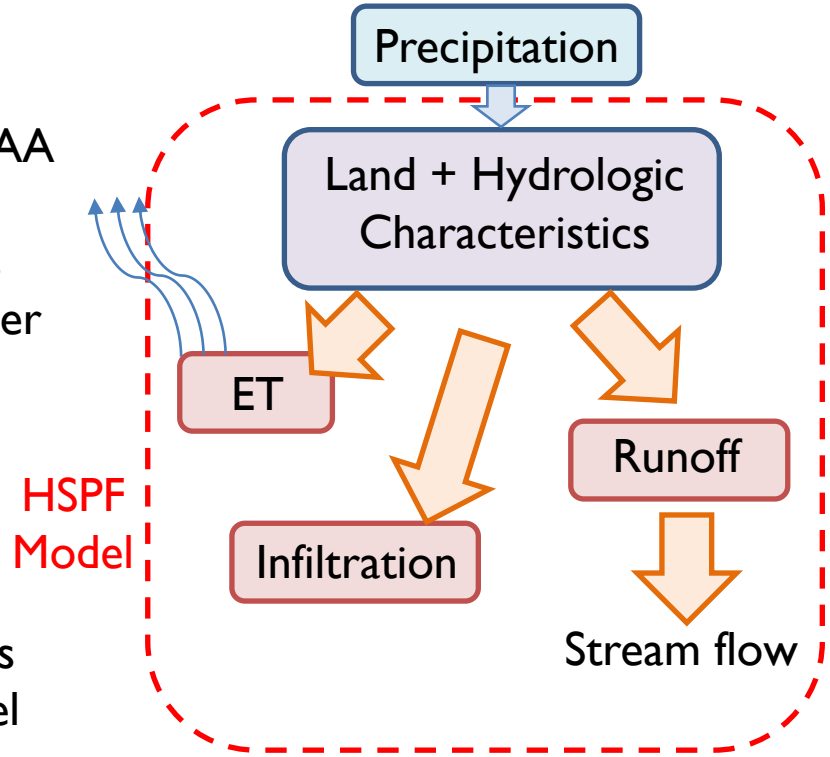


A watershed model previously funded by EAA to evaluate alternative recharge calculations is used to generate a water balance



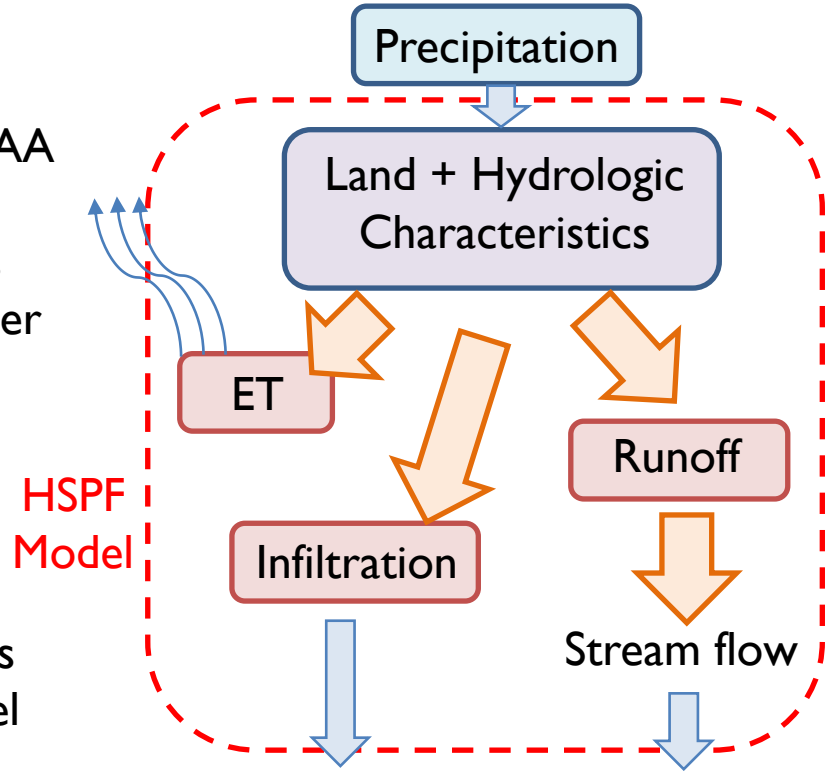
The three main outputs of the watershed model are (i) ET losses, (ii) runoff, which eventually becomes stream flow, and (iii) infiltration

A watershed model previously funded by EAA to evaluate alternative recharge calculations is used to generate a water balance



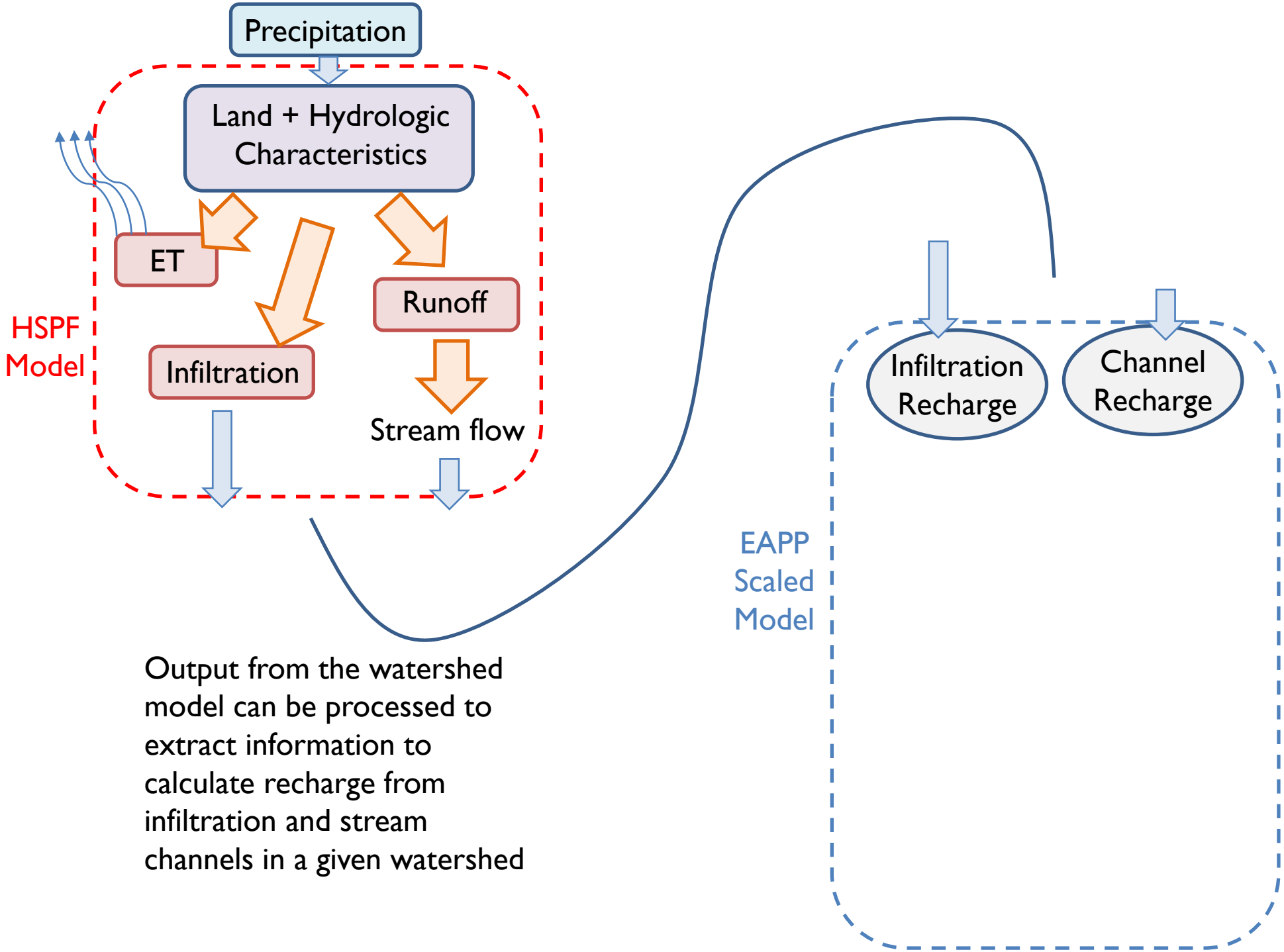
The three main outputs of the watershed model are (i) ET losses, (ii) runoff which eventually becomes stream flow, and (iii) infiltration

A watershed model previously funded by EAA to evaluate alternative recharge calculations is used to generate a water balance

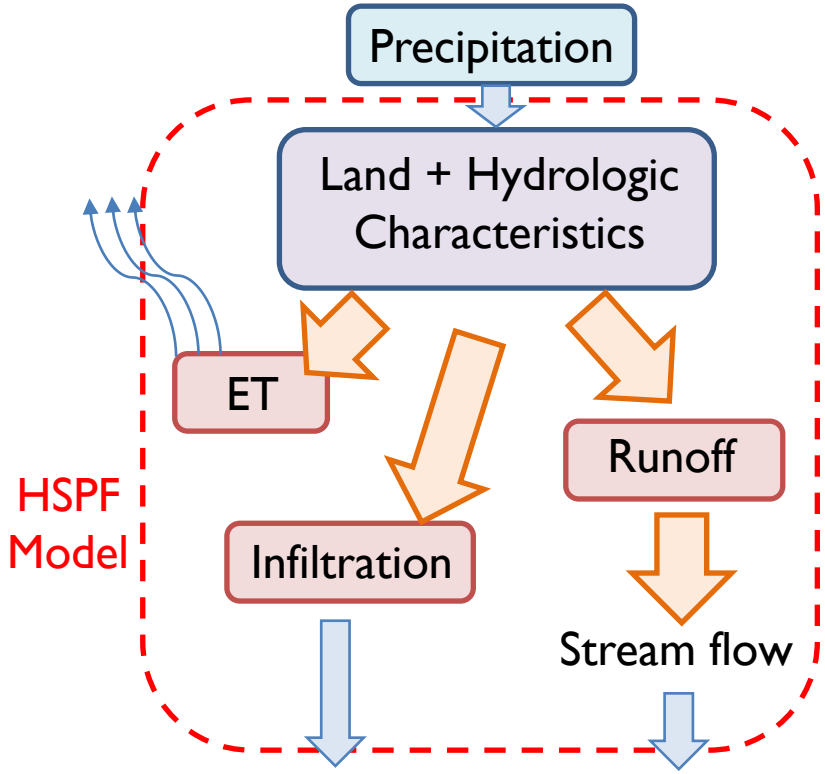


The three main outputs of the watershed model are (i) ET losses, (ii) runoff which eventually becomes stream flow, and (iii) infiltration

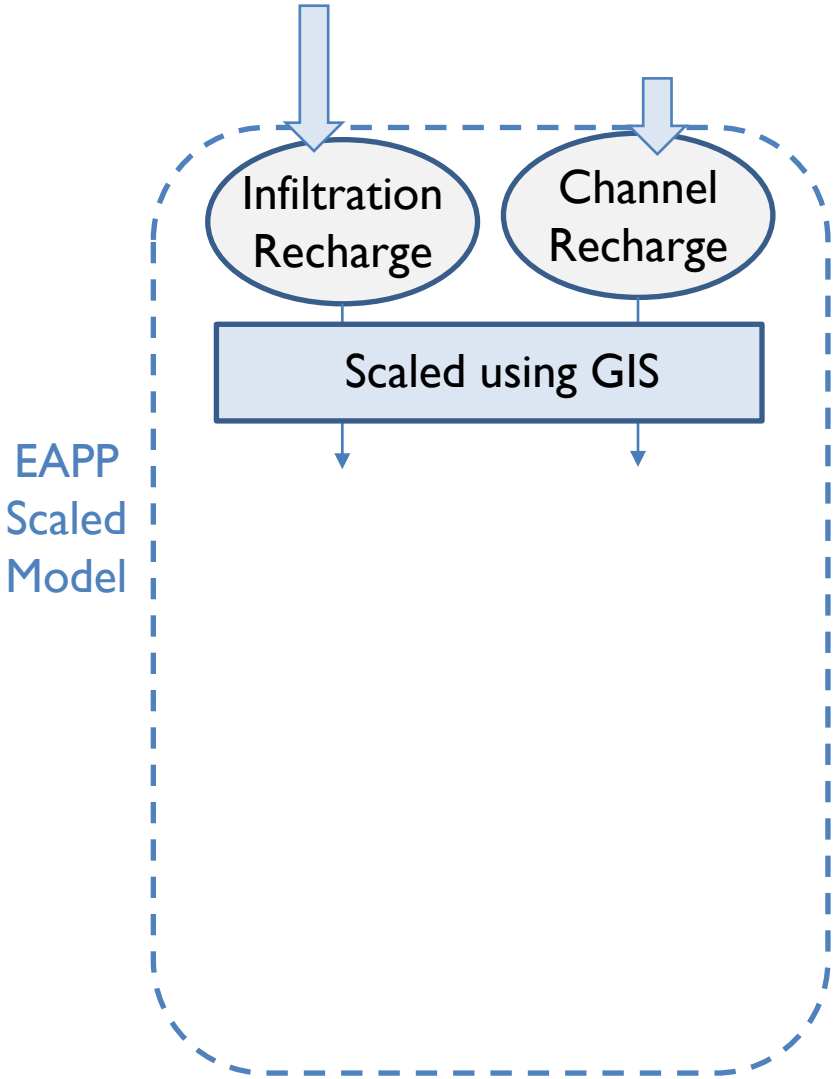
Output from the watershed model can be processed to extract information to calculate recharge from infiltration and stream channels in a given watershed

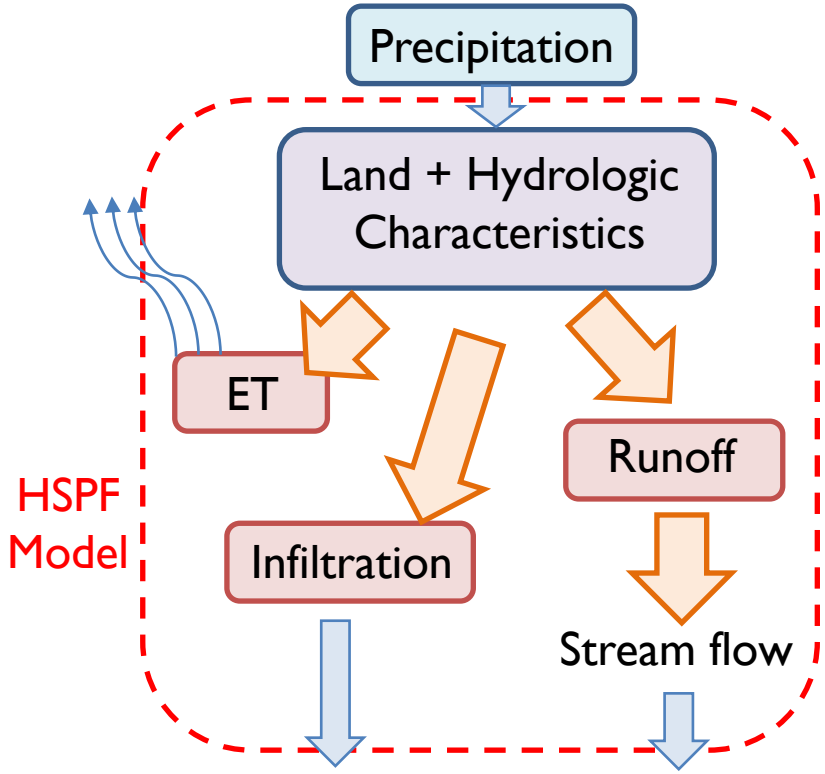


Output from the watershed model can be processed to extract information to calculate recharge from infiltration and stream channels in a given watershed

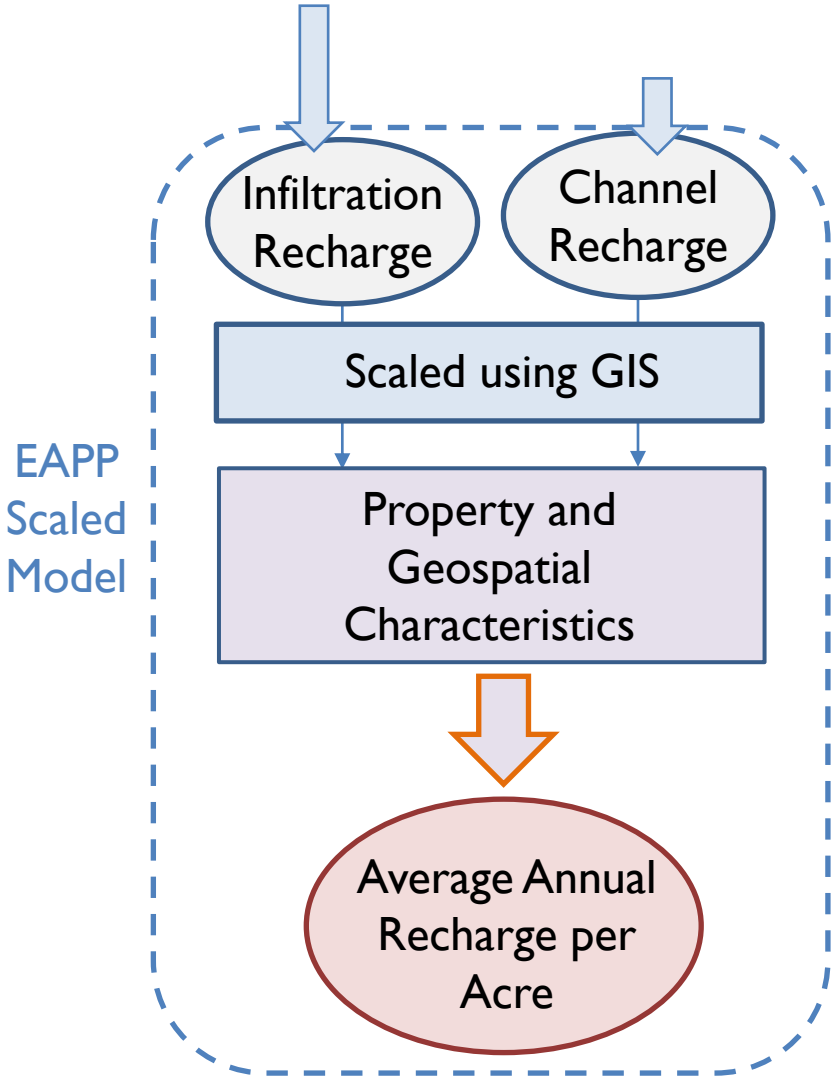


GIS tools are used to scale the results from watershed size to the size of individual properties



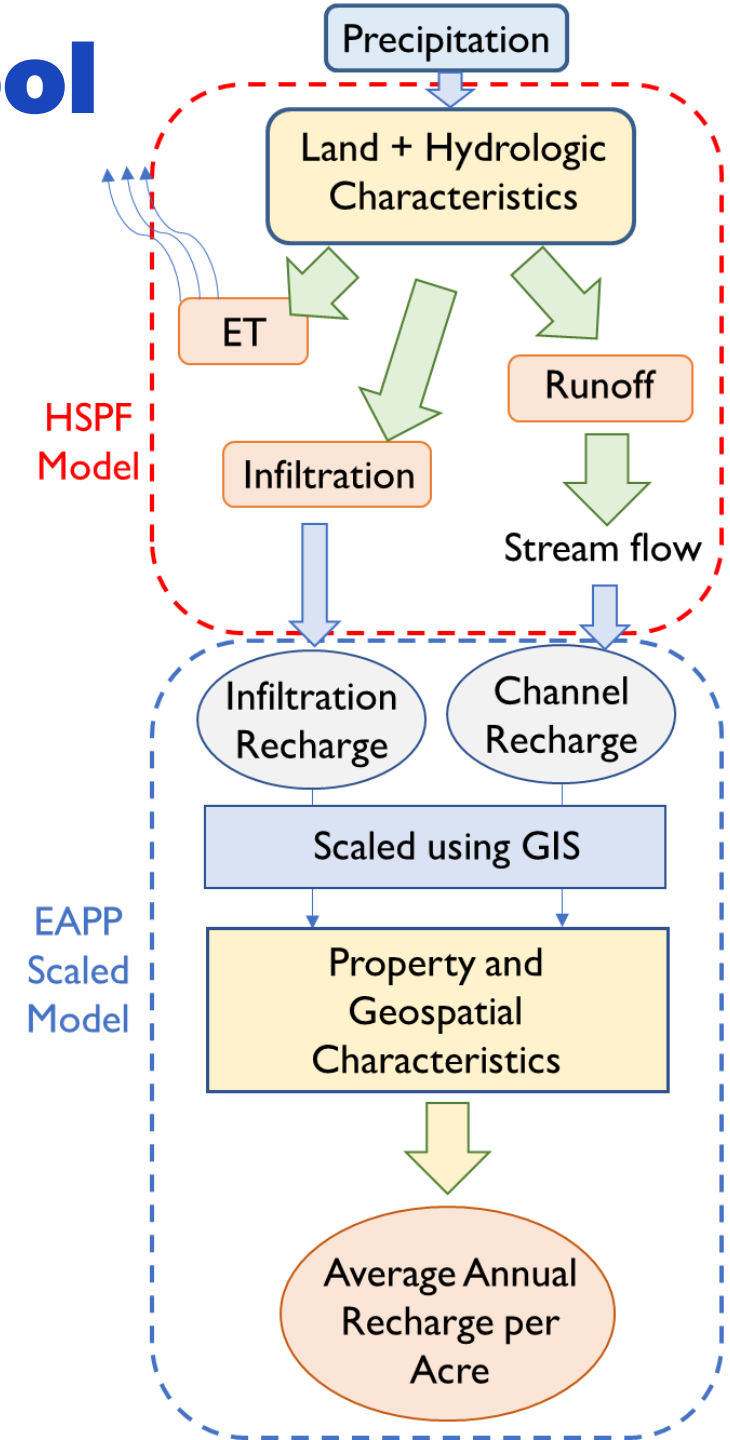


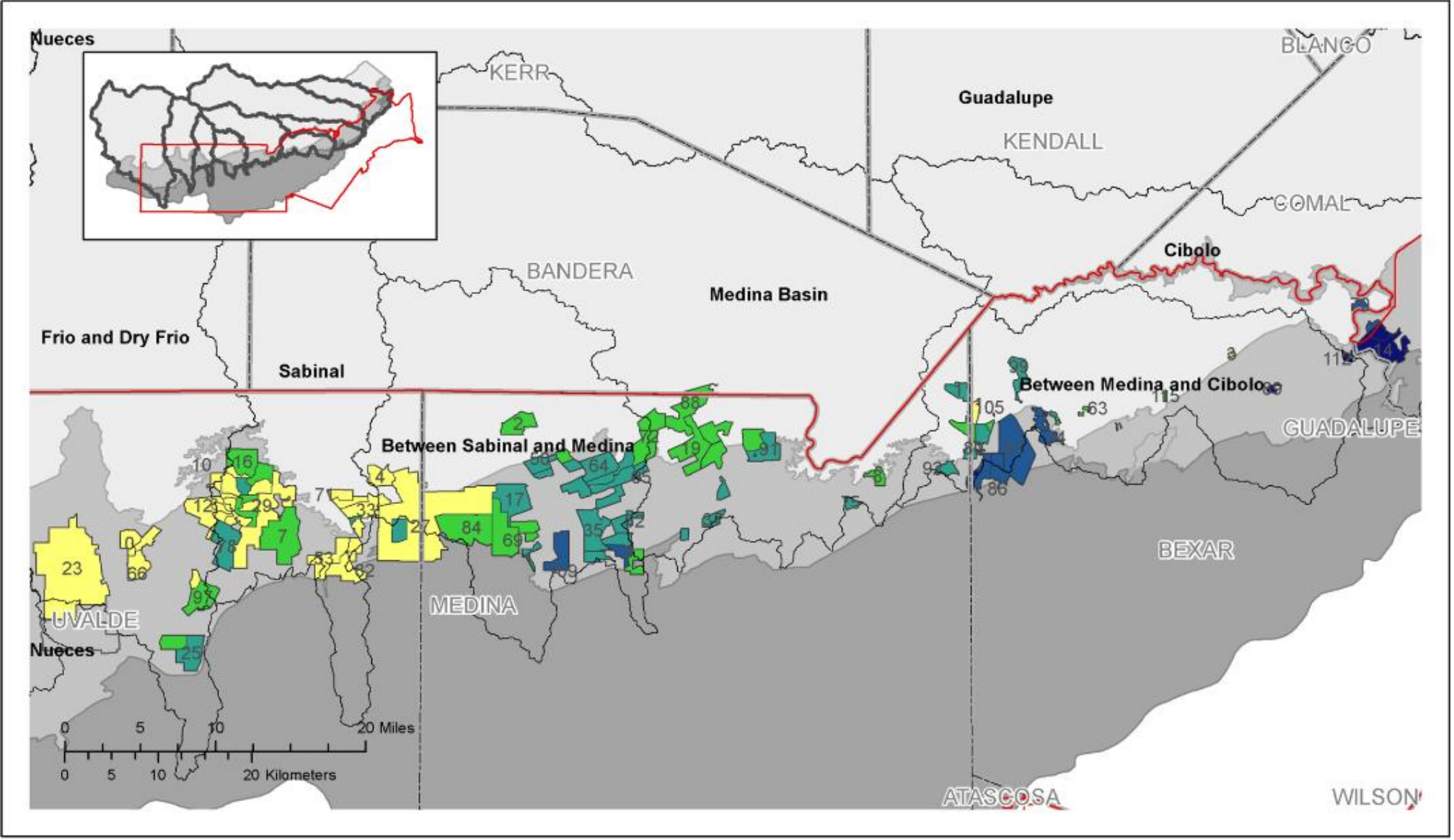
Spatial location, area, and other information are then used to calculate average annual recharge per acre for each property/easement



The EAPP assessment tool

- Recharge per acre can be used with cost and other factors to assess efficacy or guide future acquisitions
- Components of the model can be adjusted
- GIS integration can complement current EAPP tools (e.g., SET GIS model)
- The approach utilizes existing technology
- A model was developed in late 2020 to evaluate the feasibility of the approach





EAA Jurisdiciton

9 HSPF Basins

Averge Annual Recharge per Acre

LOWER HIGHER

Aquifer Zones

- Artesian Zone
- Drainage Area
- Recharge Zone

The results from the feasibility study

- Approach can be applied at the property scale
- Enough difference in "property performance" to make model effort worthwhile
- Still some technical challenges to overcome
- Many related applications – look back or look forward

Path Forward

- We propose development of a full model/tool
- Will include all EAA-related basins east to west
- Will incorporate/leverage information from other modeling efforts
  - Coupled model development in Blanco River basin
  - Calibration and conversion to "new" HSPF code used as part of EAA's climate change assessment
  - Compatible or inclusive of many SET GIS model features
- Approximately 18 to 24 months to complete
- Cooperatively funded