Integrated Water Resources Modeling

A Collaborative Process

Hugo B. Fischer Award
Acceptance Presentation
by
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WOODARD &CURRAN

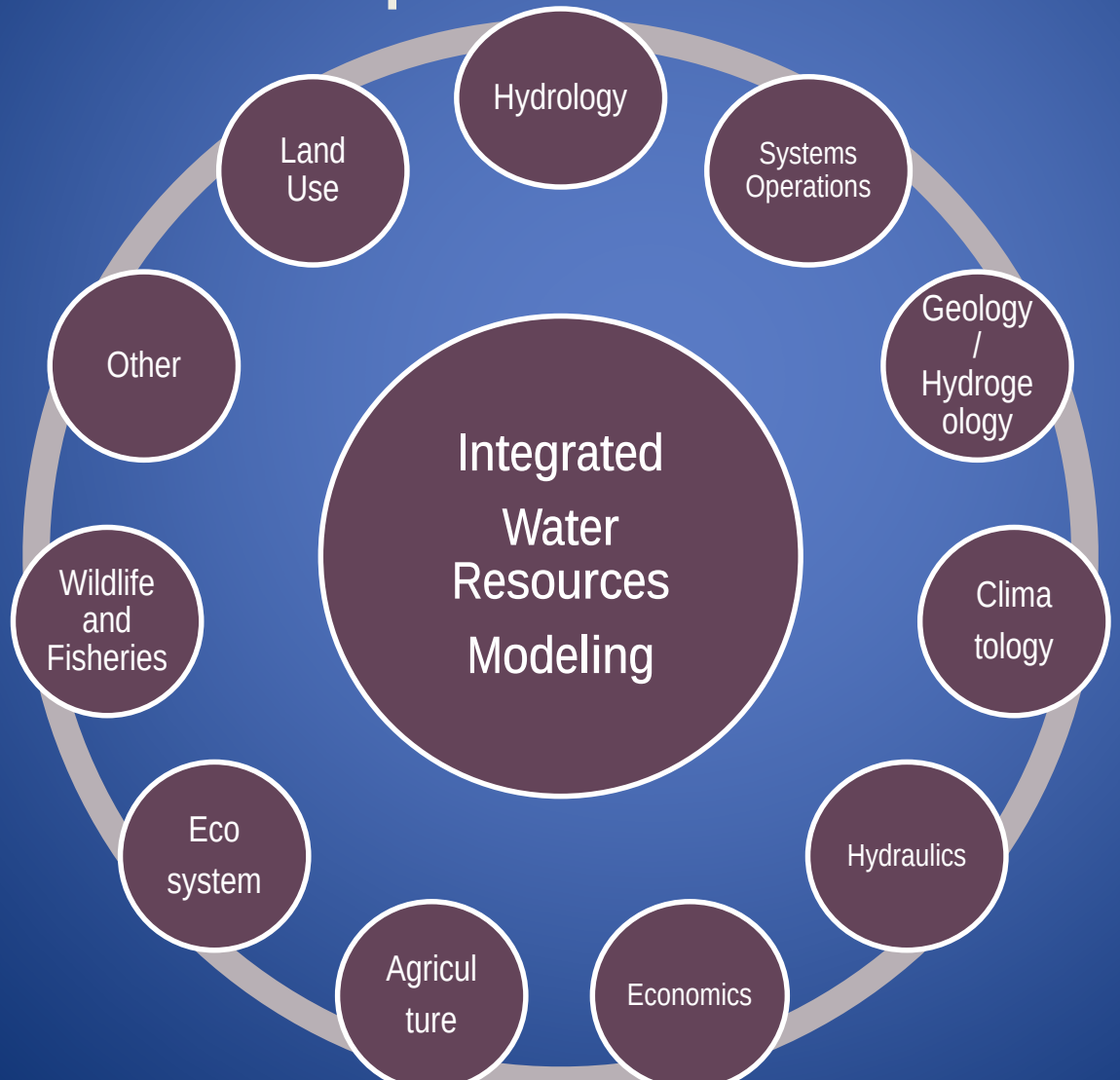
Thanks to

- My mentors, Hugo Fischer, Miguel Marino, Richard Howitt, Young Yoon, Ben Everett
- My colleagues at the DWR, USBR, and USGS
- My clients
- My partner, Saquib Najmus
- My co-modelers over the years
- My team members
- My life partner, Marzie; and my sons, Ehsan and Imaan

"All models are wrong, but some are useful“

- A model is simplification or approximation of reality, therefore it does not reflect the reality, and is wrong by nature
- A model can be ranked from very useful, to useful, to somewhat useful, and eventually to essentially useless
- If the model is to be useful to the user, then the user needs to be engaged at every step of the way in design and development of the model
- Users in most integrated water resources models, are managers of water resources at the local level

Integrated Water Resources Modeling Is Influenced by Numerous Discipline Areas



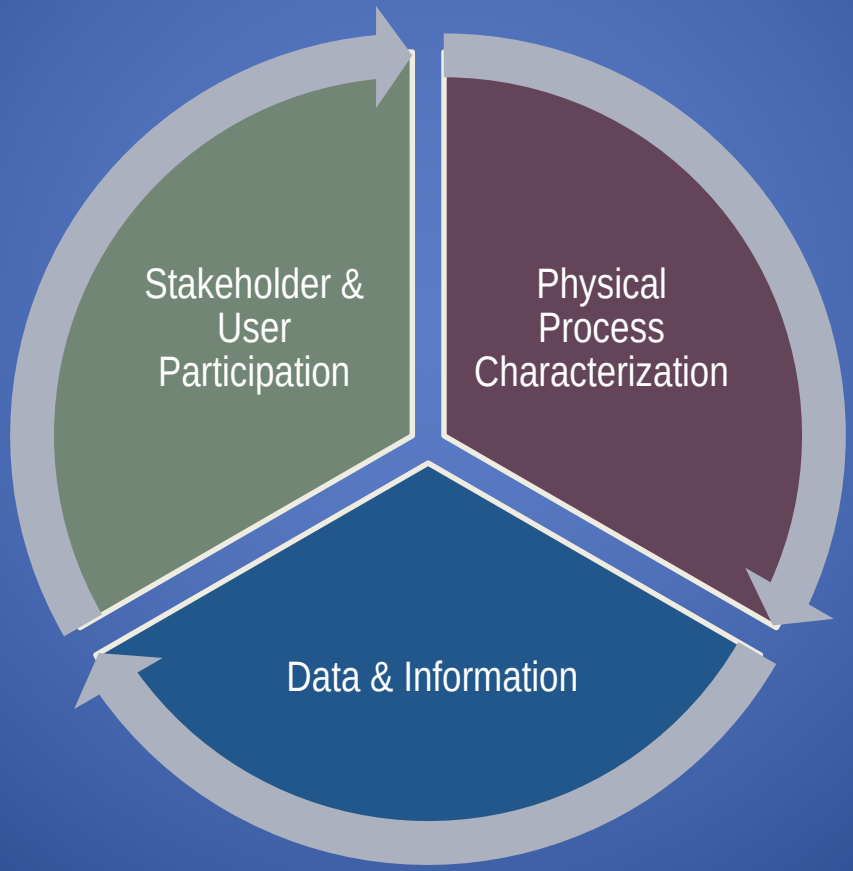
Key Challenges in Use of Integrated Water Resources Models

- **Goals and Objectives** are a key part of modeling process
- **Platform** often time becomes the focus and not the means
- **Data** requirements and needs are a function of the questions asked
- **Stakeholder participation** has often been a passive mode for model developers

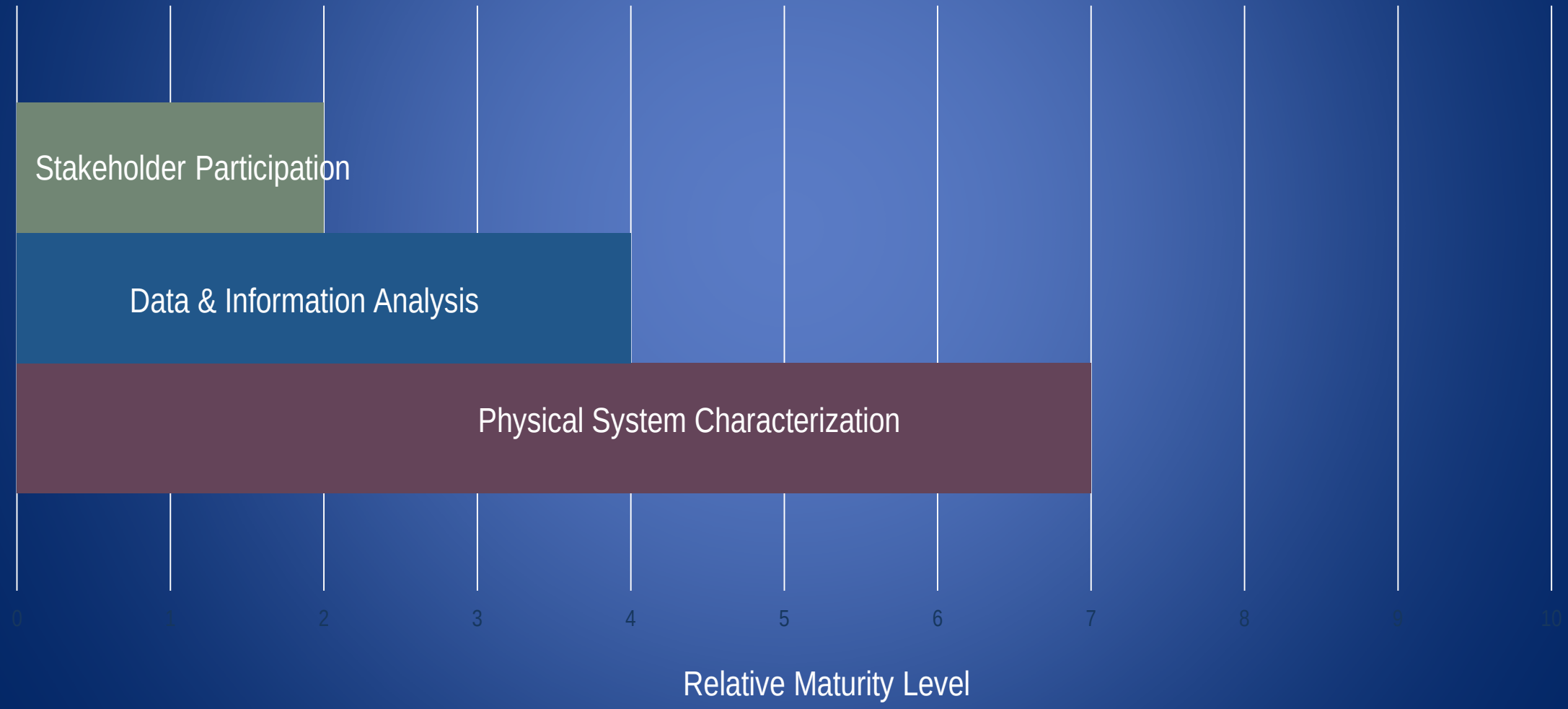
```
def add5(x):
   return x+5

def dotwrite(ast):
   nodename = getNodename()
   label=symbol.sym_name.get(int(ast[0]),ast[0])
   print '    %s [label="%s' % (nodename, label),
   if isinstance(ast[1], str):
      if ast[1].strip():
         print '= %s"];' % ast[1]
      else:
         print '"]'
   else:
      print '"];'
      children = []
      for  in n, childenumerate(ast[1:]):
         children.append(dotwrite(child))
      print ,'    %s -> {' % nodename
      for  in :namechildren
         print '%s' % name,
```

Dimensions of Water Resources Models



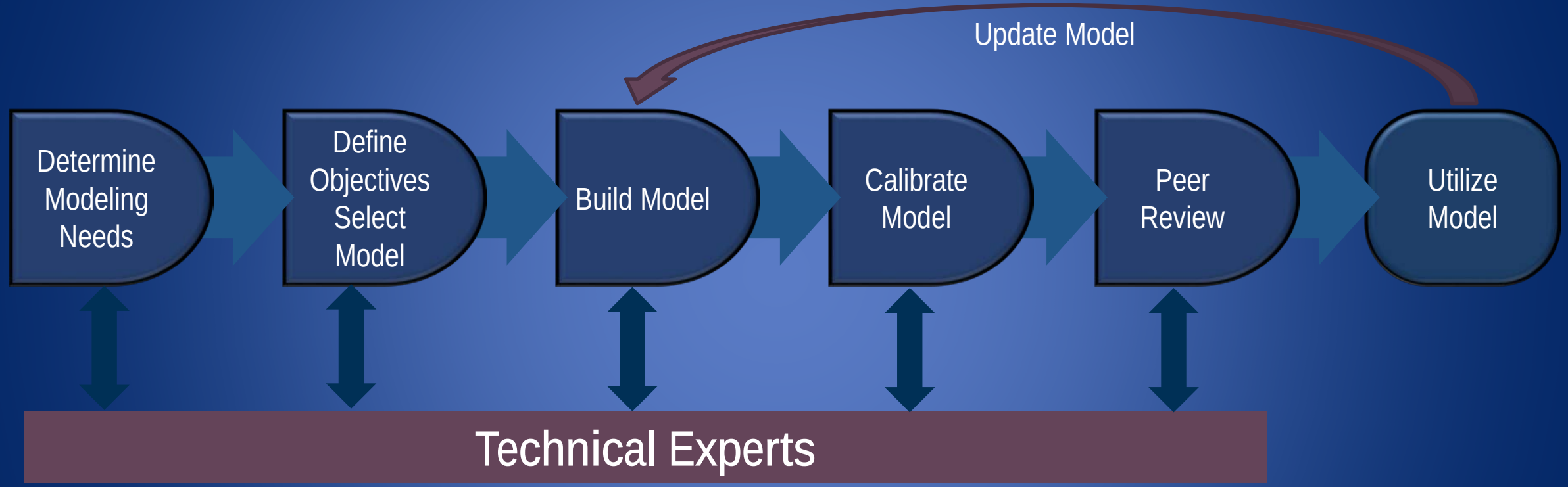
Dimensions of Water Resources Models



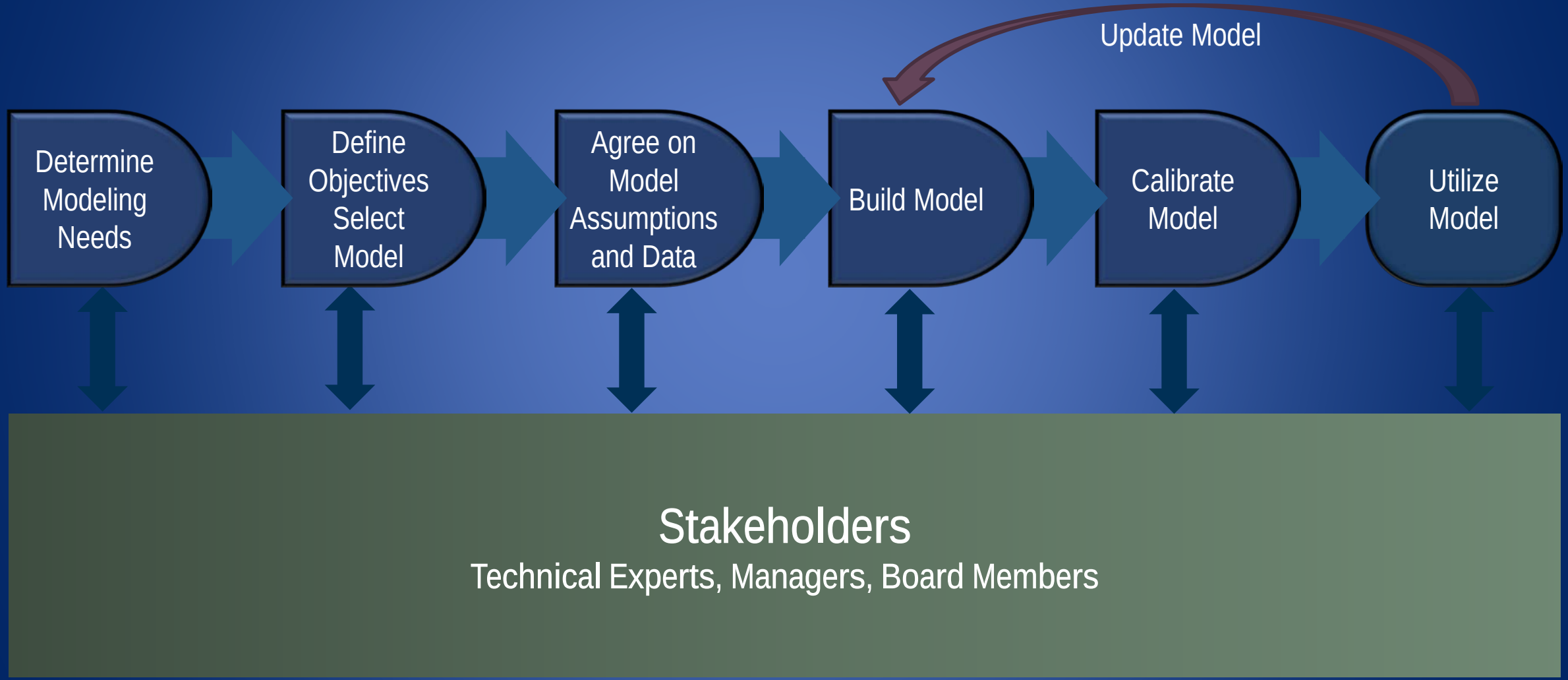
Collaborative Decision Making & Participation*

* Adapted from Arnstein, 1969; Burns, 200; Mostert, 2003

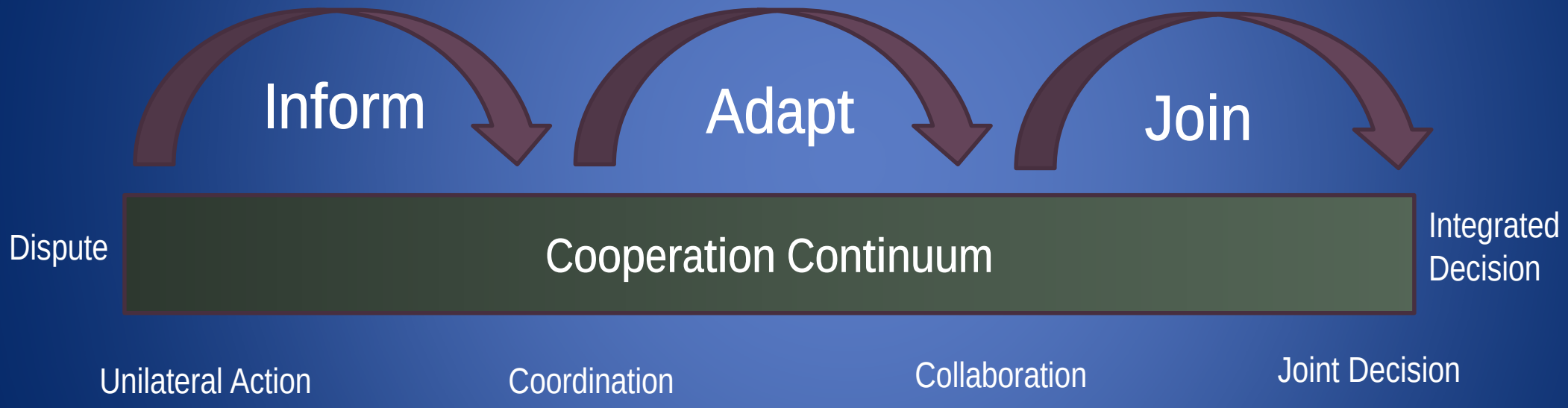
Traditional Model Development Approach



Collaborative Model Development Approach



Cooperation Continuum



Adapted from Sadoff and Grey, 2005

Summary

- DWR & Federal Agencies:
  - Refine SGMA modeling BMP to encourage a fully collaborative approach to model development and use
  - Implement a phased approach in release of the basin scale models, which would encourage and allow for collaborative modeling process
  - In providing support to the GSAs, focus attention on data, assumptions, and model results, rather than the detail processes entailed in the model source code
- Local Agencies: Ensure implementation of SGMA with a strong technical support in a collaborative environment
- NGOs:
  - Collect and analyze more efficient data and information for use in models
  - Increase level of participation in integrated model development process
- Consultants: Work with local clients to raise awareness of model use in a collaborative process for development and application of integrated models