

# **DECISION SUPPORT FRAMEWORK (DSF)**

**(Formerly Decision Support Platform)**

**Ecosystem Services Research Program (ESRP)**

**Presented by Ann Vega (EPA/ORD)**

To:  
Science Advisory Board  
Ecological Processes and Effects Committee  
July 15, 2009 – Washington, DC

# Outline

- **SAB Comments/Quality Reviewer Comments**
- **In Response:**
  - **Management Action**
  - **Workshops**
- **Major Lessons Learned So Far**
- **Emerging Vision**
- **On-going work**
  - **Database**
- **Proposed Next Steps**
- **Proposed Revised Goals**
- **Challenges**

# Summary of SAB Comments (EPEC Advisory)

- **Lack of in-house expertise**
- **Combine the DSP with Outreach and Education (OE)**
- **Adequately describe how the DSP would work**
- **Concerns about feasibility of developing the DSP**
- **Develop connections and utilize outside partners**
- **Define potential clients**

# SAB Quality Reviewer (summary)

- **Don't assume a DSP is what is needed**
  - Understand decision-maker needs before determining what to do to improve ESRP-related decision-making
- **Focus on creating deliberative processes**
  - To help decision-makers understand impacts of their decisions on ecosystem services
  - Requires active, continuous engagement with stakeholders and decision-makers

## SAB Report (2000) “Toward Integrated Environmental Decision-Making”

- Need “to assess cumulative, aggregate risks; to consider a **broader range of options** for managing or preventing risks; to make clear the **role of societal (public) values** in deciding what to protect; to **clarify the trade-offs** (including costs and benefits) associated with choosing some management scenarios and not others; and to evaluate progress toward desired environmental outcomes.”
- The SAB suggested a Framework for Integrated Environmental Decision-Making that “adopts an **interdisciplinary approach** that **combines deep understanding of environmental science with theory and empirical methods in behavioral and decision science.**”

## Management Action - Increase R&D Capability

- **NRMRL New Hires: Decision Analysis/Probabilistic Modeling; Macro Economist**
- **Cross-ORD Post-Docs: Valuation/Decision Support; Decision Analyst (DA)**
- **NRMRL/BOSC DA Workshop**
- **ESRP Experts**
  - **Mitch Small (DS/DA expert)**
  - **Amanda Rehr (DS/DA expert)**
  - **Peter Shuba (Stakeholder Involvement expert – Coral Reefs)**
  - **John Bolte (DS/Modeler expert - Willamette)**
  - **Allyson Beall (Stella Model/Stakeholder Involvement expert – O&E)**
  - **Ken Reckhow (DA expert; water quality - Modeling)**
  - **Neptune and Company; Shaw (DA/DS/Modeling contractors)**

## Management Action - Increase R&D Capability

- **Current DSF Partners**
  - **Mark Judson (IT expertise – Tampa Bay partner)**
  - **EBM Tools Network**
  - **MIT-USGS Science Impact Collaborative (MUSIC)**
  - **NOAA (via Coral Reefs team)**
- **“On-the-job training”**
- **Expertise Yet to be Tapped:**
  - **Ralph Keeney (DA expert; risk analysis expert)**
  - **Helmholtz Centre for Environmental Research (Germany)**
  - **NCER grants**
  - **OPEI expertise**



## Workshop – Coral Reefs/DSF

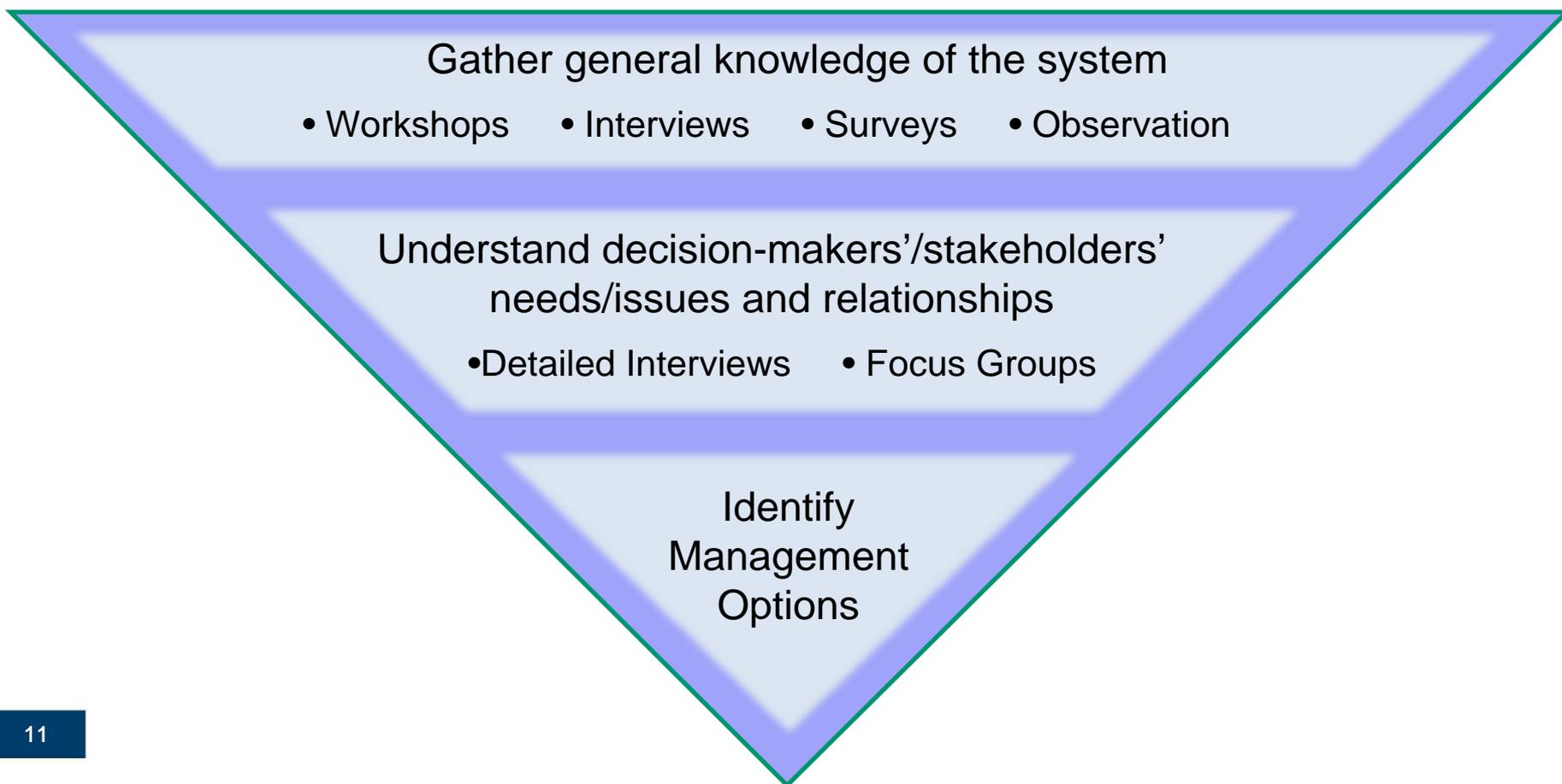
- **Co-led workshop with Coral Reefs team at the Florida Keys National Marine Sanctuary**
- **Main concerns: climate change, land use change, overfishing**
- **Decision-makers need an integrated approach to coral reef system management – this includes (but is not limited to):**
  - **Educating people about the condition of the coral reef ecosystem**
  - **Understanding effects of land use on coral reef ecosystem and informing these decisions (e.g., road widening)**
  - **Addressing impacts such as extracting resources and damage to reefs caused by anchors, touch, physical/chemical changes, etc**
  - **Management based science and science based management**

## Major Lessons Learned So Far...

- **DSP for all of ESRP – unrealistic – focus on DSF**
- **Need to use participatory decision-making to develop and evaluate a variety of potential management options for specific problems**
  - **Use an integrated, multi-disciplinary team including social scientists and economists**
- **Determine if we can identify “common” decisions and potentially develop a more broadly applicable DSF**
- **Social networking tools and analysis seem promising for bringing concerned groups of people together around a problem**

# Emerging Vision - DSF

From the Big Picture to Specific Decision Alternatives (Management Options)



## Evaluate Management Options

For each option:

Option A

Option B

Option C

Identify drivers (human needs, e.g., access to ocean for food, recreation, etc.)

Identify pressures (human activities, e.g., road expansion, housing)

Identify environmental, ecological, political, regulatory, economic, societal conditions (state)

Identify impacts to ecosystem services and cultural values (what people care about)

Understand interrelationships between all of the above, the strength of those effects, and uncertainty

Understand legal, scientific, technological and economic constraints and limitations

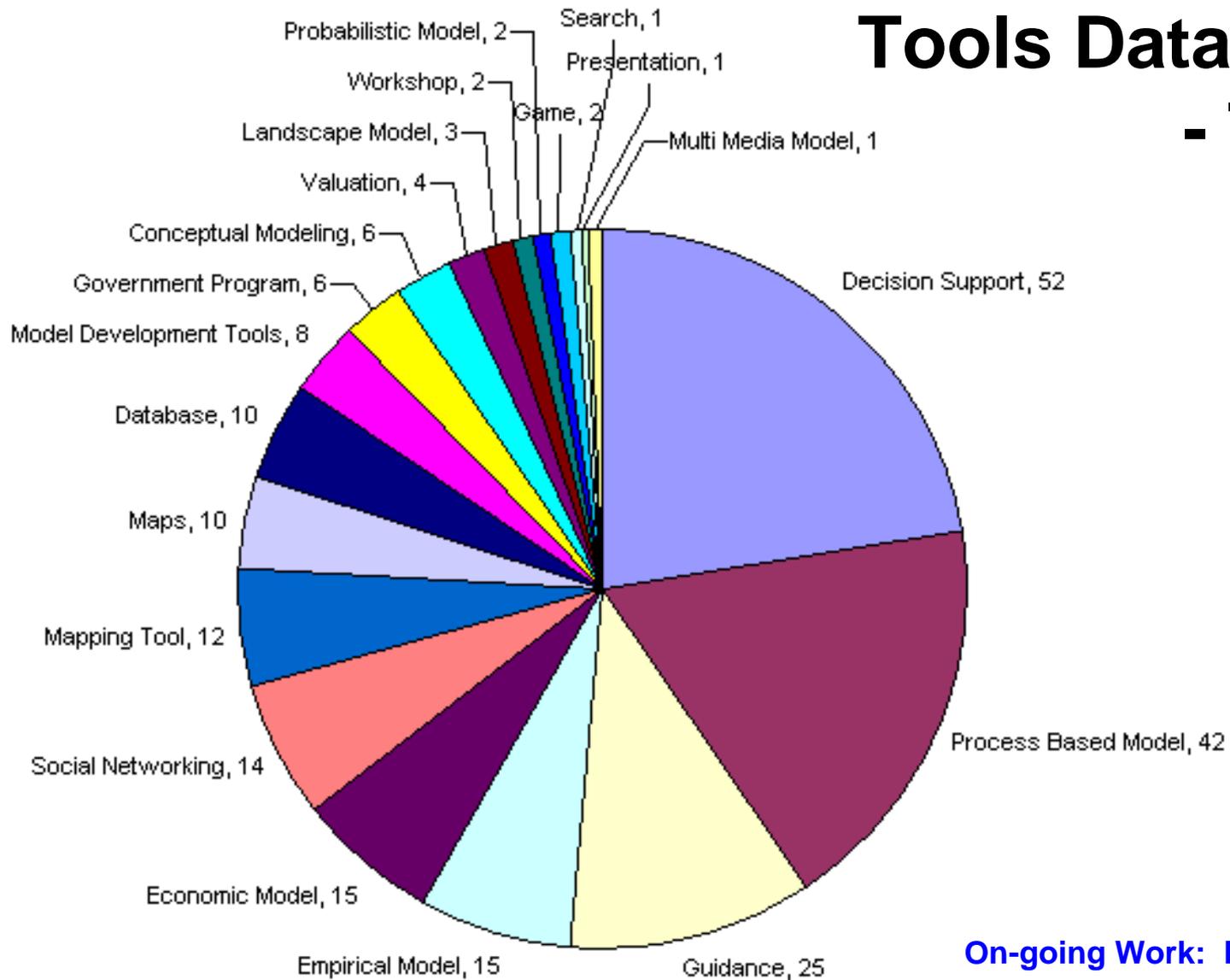
Use sensitivity and uncertainty analysis to determine where more research is needed and where actions would result in the greatest benefits.

Preferred Option

Emerging Vision



# Tools Database - Type



On-going Work: Database

## Proposed Next Steps

- **Continue to work directly with Coral Reef decision-makers**
  - **Multiple locations with similar concerns but different political climates, stakeholders, decision-makers, levels of expertise/experience**
- **Review and evaluate participatory decision-making processes used in other ESRP projects**
- **Co-Develop (with Nitrogen Lead) decision support product(s) for the management of Nitrogen**
- **Identify a sociologist (expert?) willing to work directly with us**
- **Increase focus on developments in the areas of participatory decision-making within the U.S.**
- **Continue to investigate social networking sites and analysis**
- **Continue to refine and improve the database (with outside partners from coral reef teams and others)**

## Proposed Revised Goals

- **Continue to populate the database; improve it based on feedback; and develop a user interface allowing access to both our database and the EBM Tools Network database**
- **Test the emerging vision in a real-world situation using an integrated, multi-disciplinary team**
- **Identify “common” decisions, if possible**
- **Enhance our knowledge and use of participatory decision making processes and social networking tools and analysis**

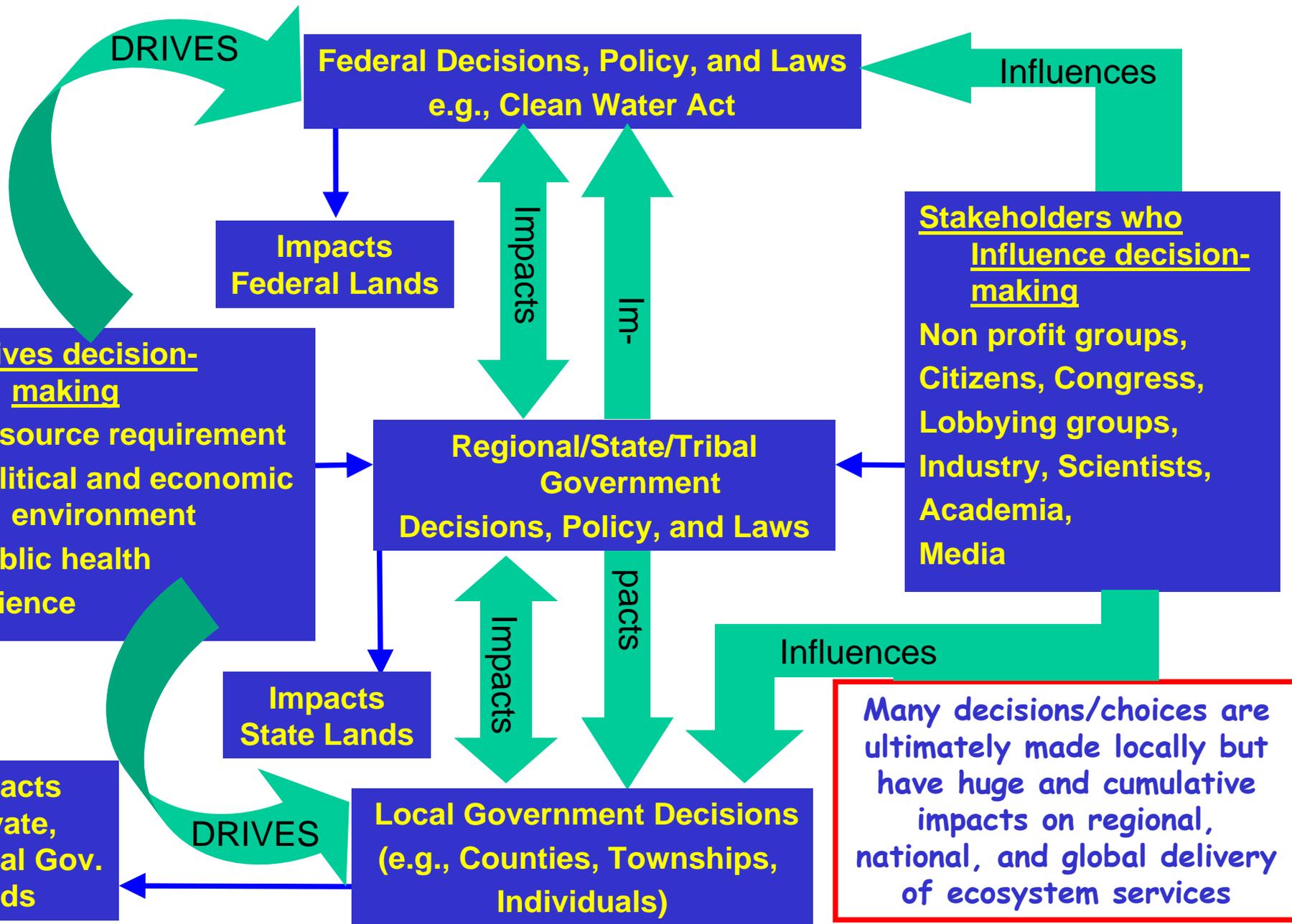
## Challenges

- **Decision-makers' responsibilities and authorities are often narrowly defined**
- **A huge potential exists for cumulative and incremental impacts of multiple local decisions on larger scales and local consequences of region/national/global environmental policy**
- **Current regulations don't always allow regulators to look at cumulative impacts**
- **Does our emerging vision serve as a way to address these challenges?**

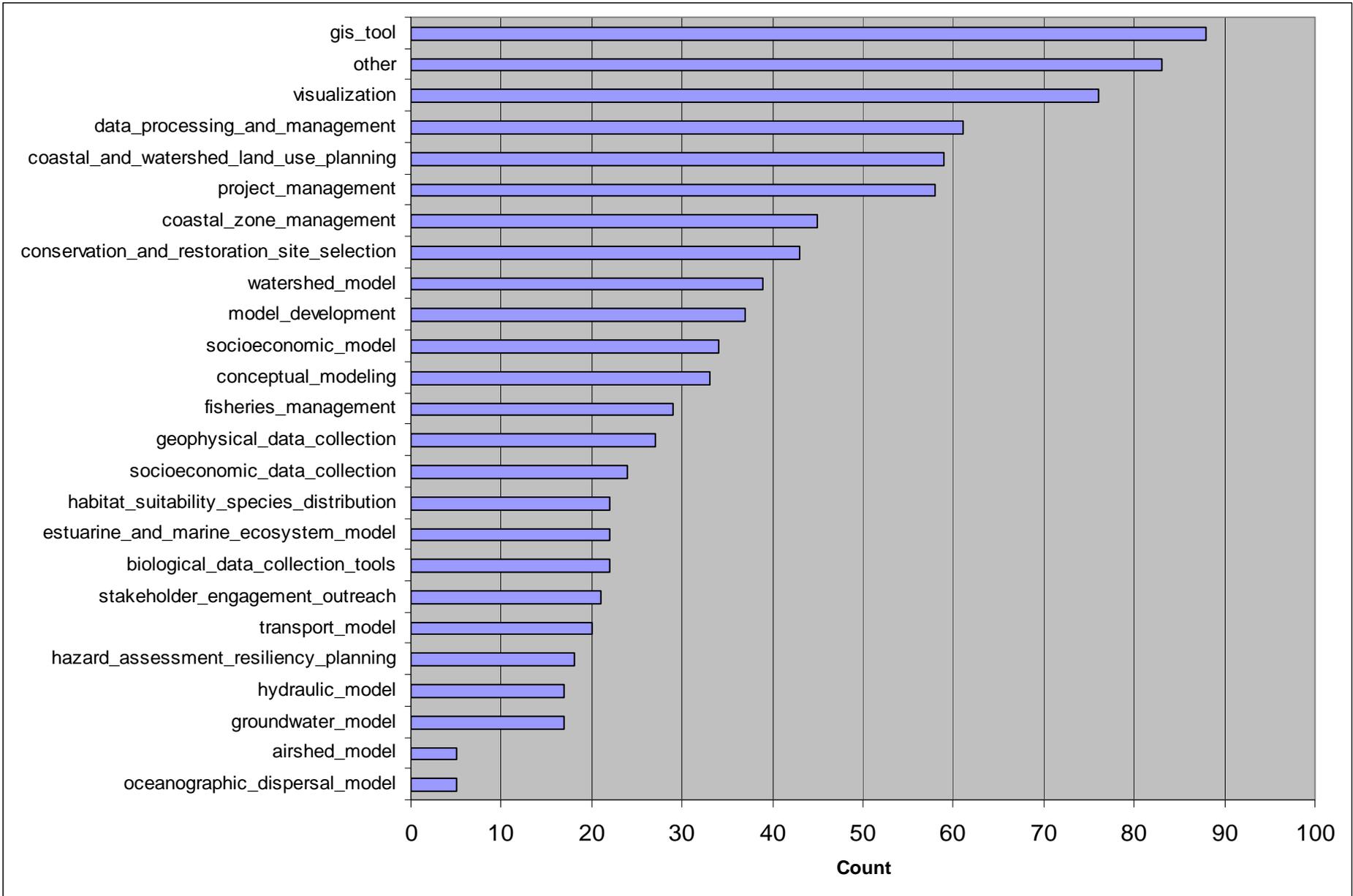
# Open Discussion



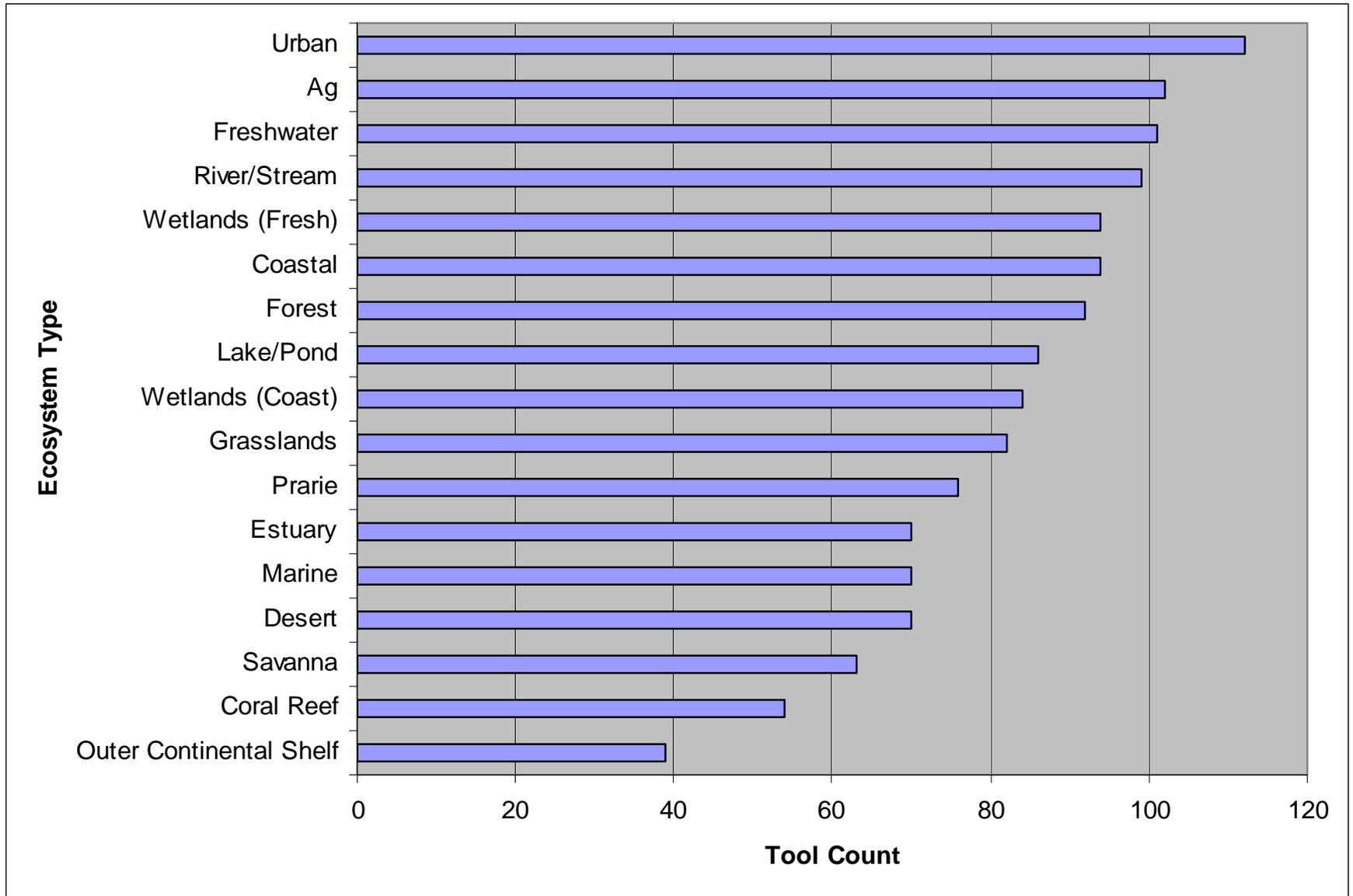
# Decision-Making Occurs at Multiple Levels



# What does the tool do...



# Ecosystem Type



On-going Work: Database

## Documents that Influenced Directions

- U.S. Environmental Protection Agency. 2000. [Toward Integrated Environmental Decision-Making](#). (EPA-SAB-EC-00-011). Office of Research and Development, Washington, DC
- National Research Council. 2005. G.D. Brewer and P.C. Stern (eds.) [Decision Making for the Environment, Social and Behavioral Science Research Priorities](#). National Academy Press, Washington, DC
- Fischhoff, B. (2008) “[Nonpersuasive Communication about Matters of Greatest Urgency: Climate Change](#).” *Environmental Science & Technology* 41(21), 7204-7208.
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