Shoreline Decisions

Who, how and why

Pamela Mason

Center for Coastal Resources Management
Virginia Institute of Marine Science

VIMS | William & Mary
Virginia Institute of Marine Science
1940-2015 75 Years

Who makes decisions

- Federal
  - Corps, EPA, NOAA/NMFS, NRCS
- States
- Local
- Property Owners
- Contractors

Federal decision drivers

Corps of Engineers

Authority §404 Clean Water Act

Use Nationwide and Regional Permits

- Predicated on no significant individual or cumulative adverse impacts of permitted activity
- Set limits on natural resource impacts, include some science-based criteria
- Operational disincentive to use individual permits

EPA, NOAA-NMFS, NRCS advise

Maryland

- Private ownership above mean high water
  - State owned tidal wetlands
- Department of Environmental Regulation
  - Employ scientists
  - Agency staff review and issue permits
  - Legislation and regulations include criteria
  - Living shorelines legislation/ requirement

Virginia

- Private land ownership to mean low water
  - Private owned tidal wetlands
- State - Local program
  - Citizen members
  - Marine Resources Commission (state) and locality Wetland Boards
  - Wetland Boards issue permits via public hearing
- Mandates VIMS scientific advisory role
  - Wetlands Guidelines produced by VIMS 1972
  - Updates have added requirements but not substantive changes since 1972
- Living shorelines “preferred”

Virginia con't

- VIMS mandate to provide advice to Commonwealth on coastal issues
- Tidal Wetlands Act
  - Conduct tidal wetland inventory,
  - Assist in development of guidance
- "Living Shorelines Act"
  - VIMS to develop comprehensive coastal resource management guidance for sustainability of resources in face of sea-level rise

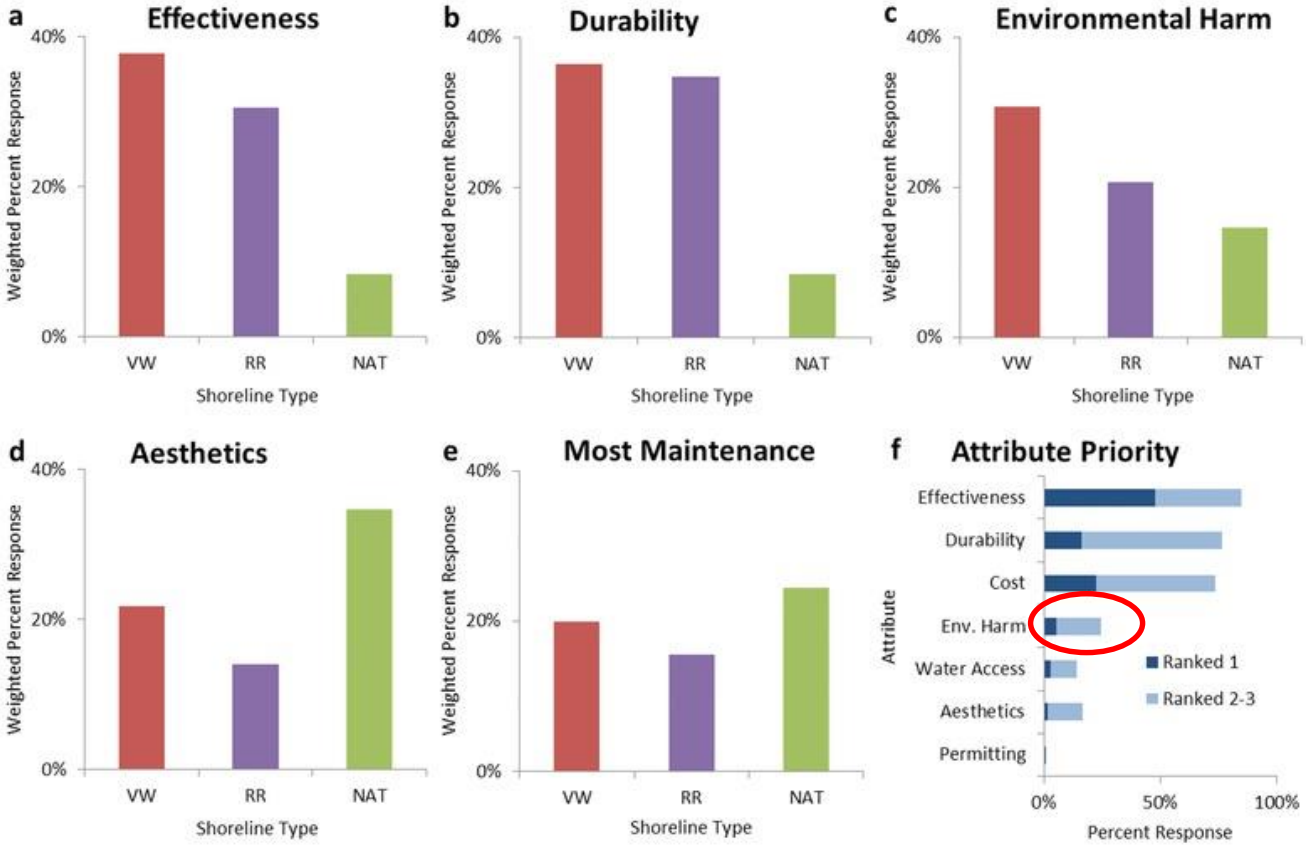
Considerations in decision making

- Factors in Decisions
  - Effectiveness
  - Longevity
  - Cost: financial & (ecological)
  - Information: knowledge of options
  - Time
  - Feasibility/ acceptability
  - Legislation/ regulation
  - Science?

Primary Interest for Property Owners

(Based on Chapter 5, Mitigating Shore Erosion along Sheltered Coasts (2007)

Property owners: Function and impact of shoreline conditions and structures Mobile Bay



Conventional structures linked to environmental harm

Conventional structures considered most effective
Ranked highest in priority

Vertical Wall

Rip-rap revetment

Natural

Scyphers, S. B., Picou, J. S. and Powers, S. P. (2015)

Participatory Conservation of Coastal Habitats: The Importance of Understanding Homeowner Decision Making to Mitigate Cascading Shoreline Degradation. Conservation Letters, 8: 41–49. doi: 10.1111/conl.12114

Property owners in Virginia

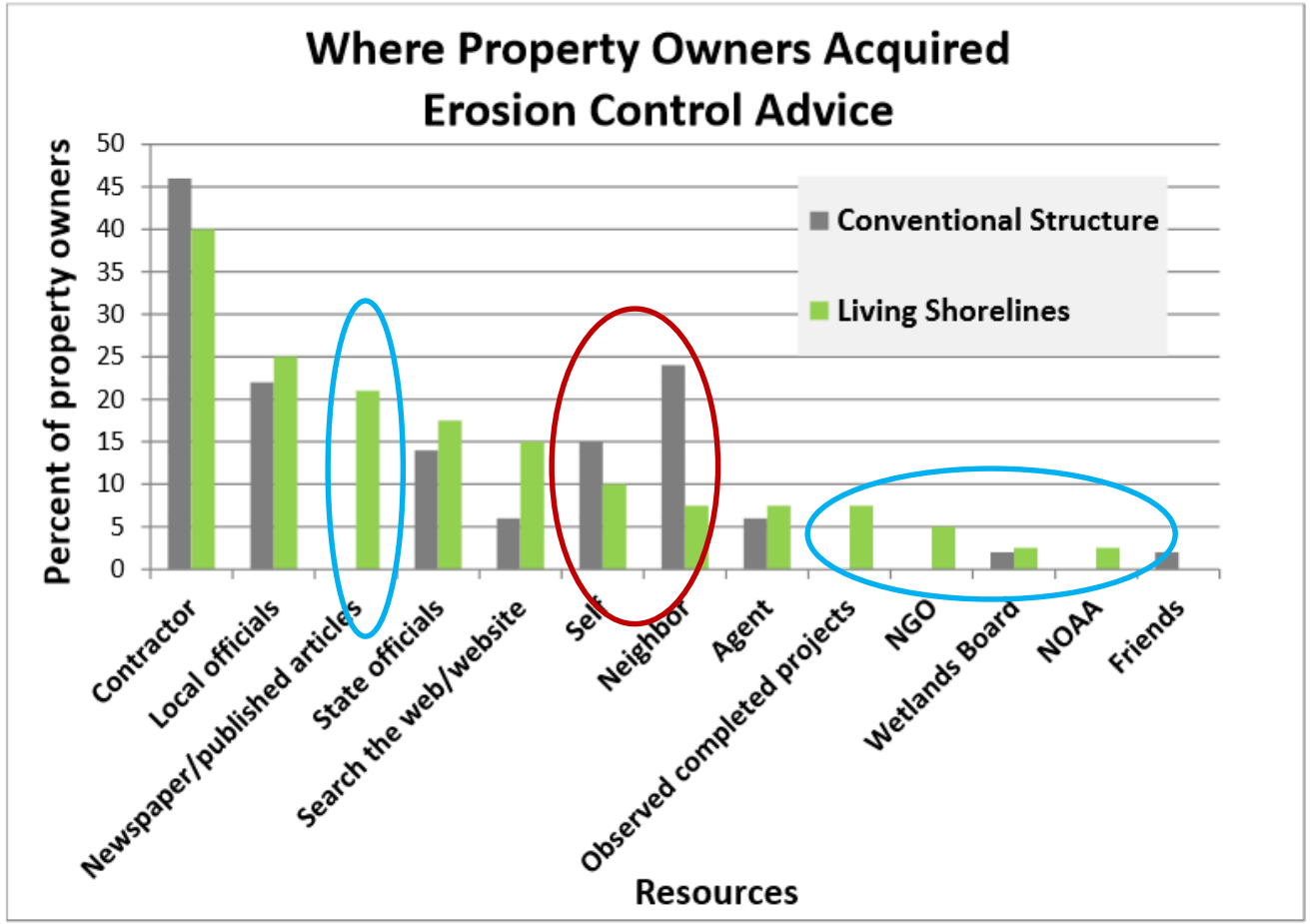


Figure 3 Shoreline erosion control information resource

Survey # @400

Conventional structures =Bulkhead and revetment

Conventional structures used when scientific guidance identified living shoreline approach

Conventional information: neighbors, self, contractors

Living Shorelines: Media, Demonstration, Outreach

Mason, P and C. Tombleson.2013. Living Shoreline Funding Questionnaire. Report to the Middle Peninsula Planning District Commission. Virginia Institute of Marine Science
http://deq.state.va.us/Portals/0/DEQ/CoastalZoneManagement/FundsInitiativesProjects/task54-12.pdf

Greatest influence

- Neighbors have the most influence
  - Neighbors shoreline condition most important
    - Scyphers, S. B., Picou, J. S. and Powers, S. P. (2015)
    - http://onlinelibrary.wiley.com/doi/10.1111/conl.12114/epdf
  - Social norms can exert a powerful influence over behavior
    - M. Amato, Nelson Institute, University of Wisconsin –Madison
    - https://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/resources/healthylakes/PropertyOwnerDecisionsaboutShorelineVegetation.pdf

Science in Virginia Decisions

- What and how VIMS provides science to shoreline decisions

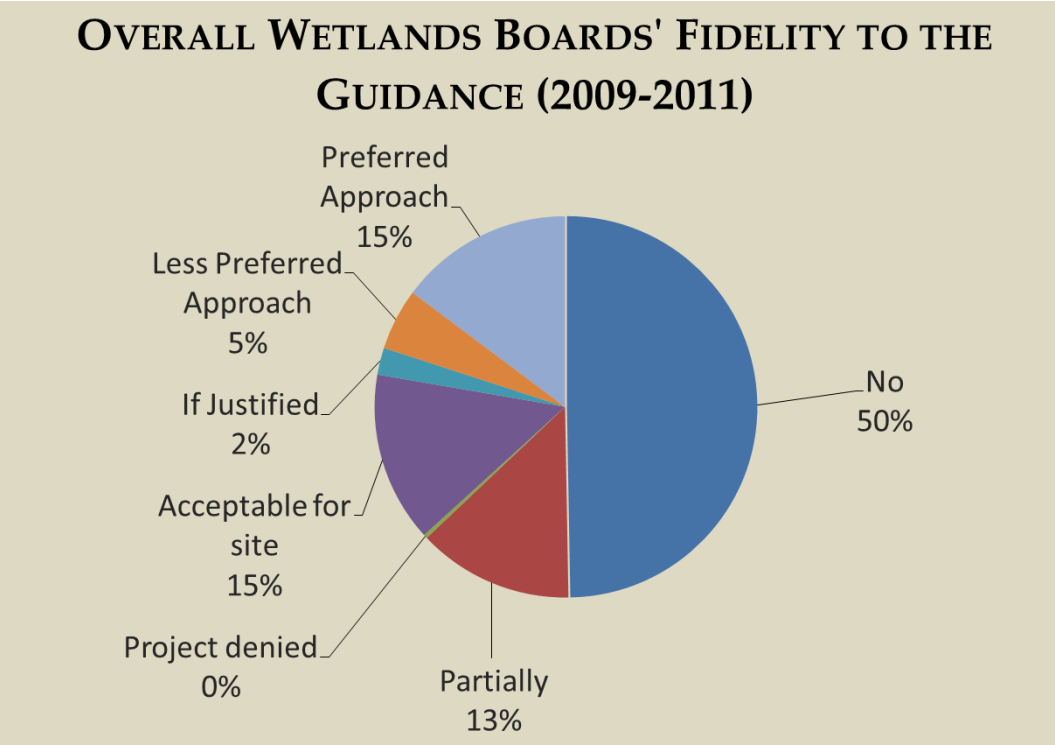
VIMS CCRM Living Shorelines Initiative

- Shoreline Management Model
  - Identifies preferred options for all shoreline settings based upon sustainability and ecosystem services
- Living Shorelines monitoring project
  - Compares LS to conventional and natural shorelines for benthic production
  - Assess nutrient load reductions
- Outreach
  - Contractors Training Education Modules / Workshop
    - Design Manual
  - Annual Workshops
  - Print and digital publication

Shoreline Management Model (SMM)

- Geo-spatial model that delivers ecosystem-based erosion control options for tidal shorelines
- Uses a knowledge-based decision tree that has been modeled in ArcGIS using Model Builder
- Requires information about onsite conditions
- Output is scaled to property-level decisions
- Delivered to the end user in map format

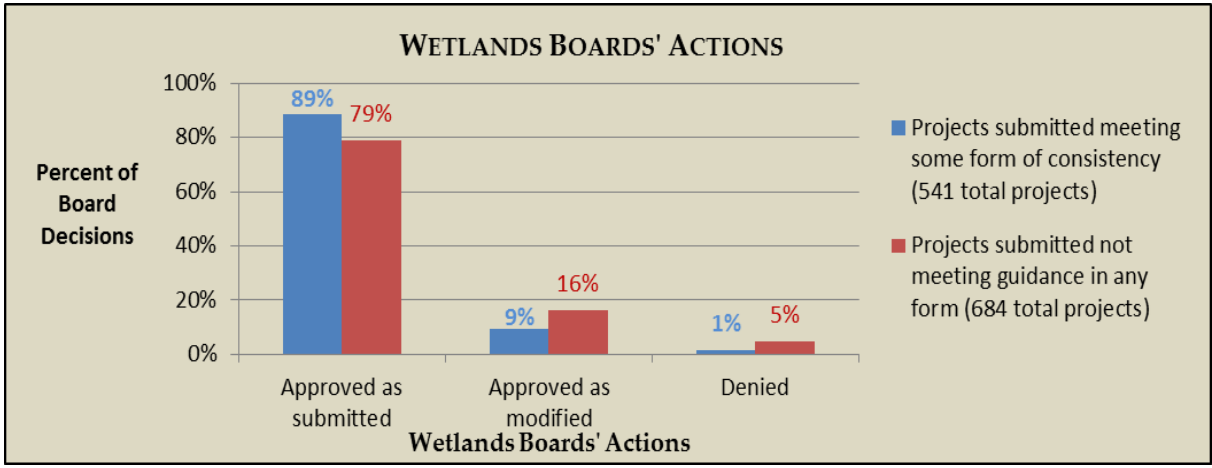
Incorporation of scientific advice Virginia



#projects=1239

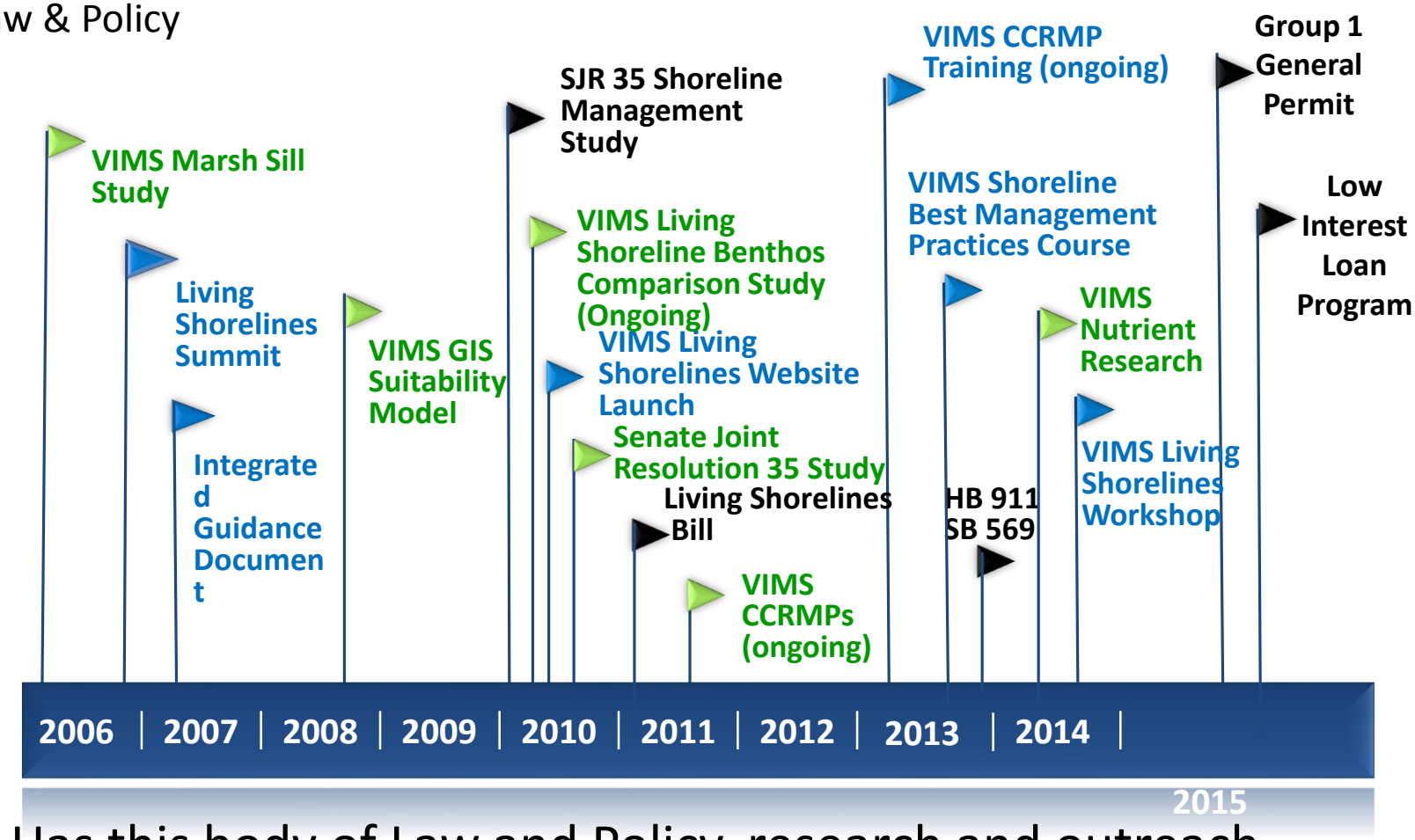
- Few projects are modified to minimize/ eliminate adverse ecosystem effects
- The estimate of projects following scientific advice is inclusive and conservative, ie includes less preferred and partially consistent with recommendation

- Majority of projects are approved as proposed
- Wetland Board Hearing process does not result in project modification to meet scientific guidance



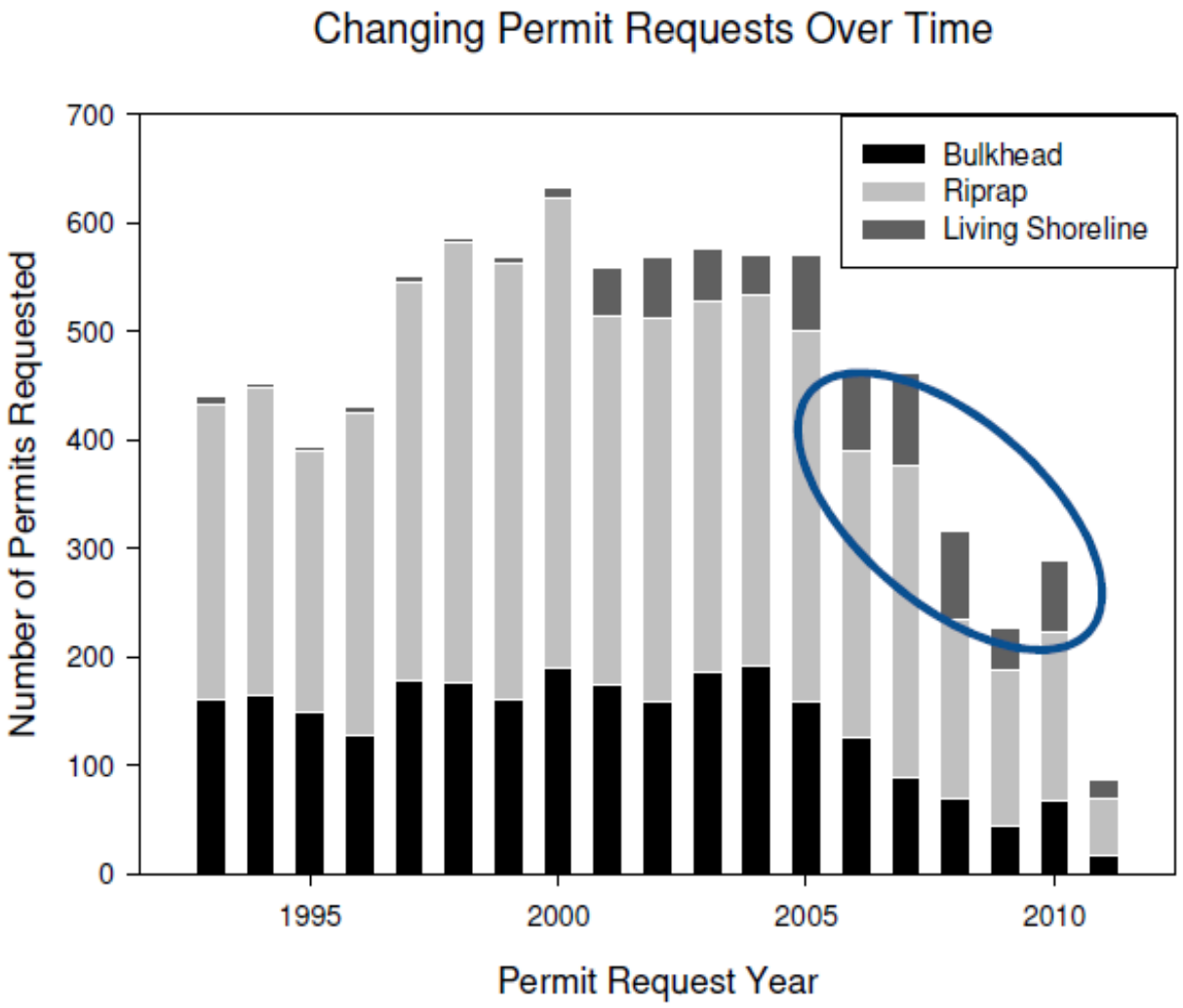
Virginia Living Shoreline Activities 2006 - 2015

- Outreach
- Research
- Law & Policy



Has this body of Law and Policy, research and outreach changed decisions in Virginia?

Virginia: Requested Projects by Type



- LS projects hover @ 20%
- Very rough estimate of eligible projects @ 80%
- No indication of any effect of significant outreach efforts
- Effect of 2011 policy not yet determined

Bilkovic & Mitchell, in press. In Living Shorelines: The Science and Management of Nature-based Coastal Protection, CRC Press

Barriers to the use of science in decisions

- Private v. public interests
  - Strong property rights
- Limited awareness of the link between ecosystems and human well-being
- Difficulty in monetizing ecosystem services
  - Erosion control, water quality and habitat services
- Interdisciplinary nature of ecosystem science
  - Complicates research

How to improve science “use”

- Ecosystem service assessment on the basis of value pluralism: comprehensive consideration of biophysical, socio-cultural and monetary value
- Demonstrate link between decisions and effect on natural capital AND human well-being
- Bring together government, business leaders and scientists together
- Change policy and practices to align private short-term goals with societal long-term goals
  - A. Guerry, et al. 2015. Natural capital and ecosystem services informing decisions: From promise to practice www.pnas.org/cgi/doi/10.1073/pnas.1503751112