ECOSYSTEM SERVICES ADAPTIVE MANAGEMENT AND LAND USE REGIMES

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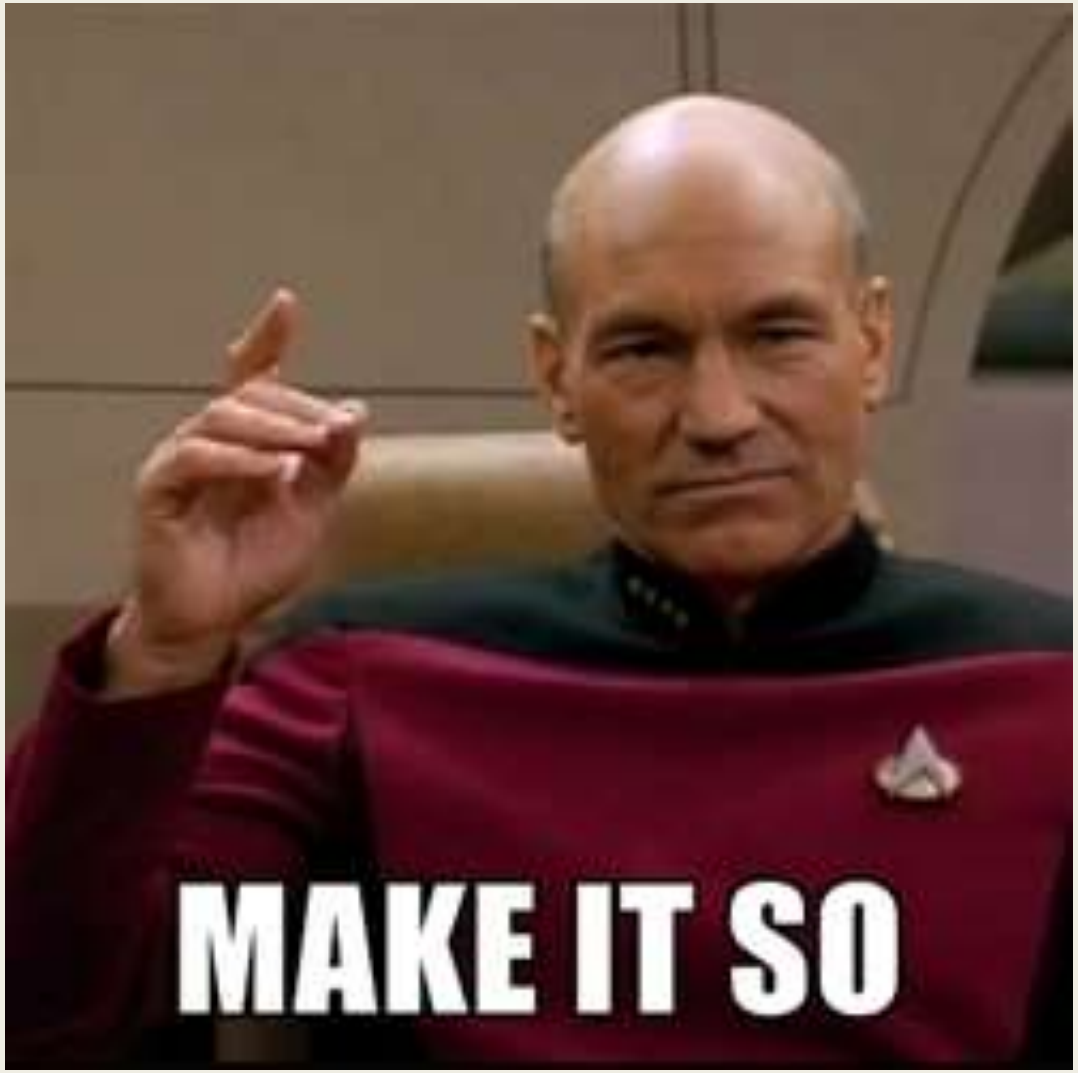
OUTLINE

- Context
- Law's role in AM of ES
- Starting points and assumptions
- The law and landscapes of land use regimes
- Categories of land use regimes
- Assessment of each category for AM of ES
- Conclusions

Context

- Ecosystem services framework gaining traction in policy (e.g., OMB directive)
  - *Still far to go on measurement and valuation*
- Adaptive management firmly embedded in policy
  - *Still far to go in actual practice*
- Adaptive management of ecosystem services sounds like a good idea
  - *But how do we make it so?*

EASY!



OK, maybe not so easy…

- Managing for ecosystem services presents significant trade-off and scale issues
- Adaptive management requires controllability
- Law can stand in the way of both
  - *Legal systems mediate trade-offs*
  - *Legal systems limit or facilitate controllability*
- In particular, ***land use regimes play*** an important role when decisions must be made about how to manage human use of landscapes and ecosystems

The Law of Land Use Regimes

- Governing Substantive Authorities
  - *Public Lands*
    - Organic statutes (e.g., Forest Service)
    - Goal statutes (e.g., MUSY)
    - Planning statutes (e.g., National Forest Management Act; FLPMA)
  - *Private Lands*
    - Zoning
    - Private covenants
    - Nuisance law
- Procedural Requirements
  - *Plan Development* (e.g., National Forest LMPs; local comprehensive plans)
  - *Pre-decision Assessment* (e.g., NEPA, ESA)
  - *Public Participation* (e.g., notice and comment rulemaking: hearings)

The Landscape of Land Use Regimes

- Can be highly fractured, or contiguous, over large scales
- Distinct land use regimes often abut
- Patchwork of governing authorities at multiple scales
- Difficult to coordinate over large landscape scales

But, we have to play with the cards we're dealt

Starting points, assumptions, and the question:

- We already do an excellent job of adaptively managing for provisioning services
  - *Easy to measure and value*
  - *Markets and fees help allocate*
- Many public and private land use disputes are about shifting the balance to enhance regulating services
- These disputes play out within a highly structured legal context
- ASSUMPTION: Goal is to rebalance towards regulating
- QUESTION: How will land use regimes facilitate or constrain that goal?

Categories and Assessment of Land Use Regimes

- Regime Types
  - *Preservation*
  - *Dominant use*
  - *Multiple use*
  - *Developed*
  - *Engineered*
- Assessment Factors
  - *Ecosystem Services*
    - How flexible in terms of managing for specific regulating services?
    - How must trade-offs be mediated?
  - *Adaptive Management*
    - How is decision making constrained?
  - *Strategy*
    - How to optimize for regulating services?

PRESERVATION	
EXAMPLES	• Wilderness areas • Endangered species mitigation preserve • Land trust preserves
FEATURES	• Restore and maintain sustainable ecosystem • Historical reference point • Highly regulated in terms of limiting intervention and manipulation
ECOSYSTEM SERVICES	• Provisioning services usually not prioritized • All ecosystem services flow incidental to management for reference point
ADAPTIVE MANAGEMENT	• Useful for maintenance of reference point (e.g., control invasive species) • Cannot interfere with reference point
STRATEGY	• Use AM where appropriate to achieve reference point • Identify and publicize incidental regulating services benefitting offsite communities

DOMINANT USE	
EXAMPLES	• Wildlife refuges • Land trust working landscapes • Croplands
FEATURES	• Maintain primary purpose • Allow compatible secondary uses • Highly regulated in terms of limiting interference with primary purpose • Dominant use often has a strong and vocal constituency
ECOSYSTEM SERVICES	• Provisioning services often are prioritized • All ecosystem services flow incidental to management for the primary purpose • Management for regulating services as secondary use may be permitted
ADAPTIVE MANAGEMENT	• Useful for maintenance of primary purpose (e.g., game management; crop production) • May be appropriate for secondary purposes
STRATEGY	• Use AM where appropriate to achieve primary and secondary purposes • Include and manage ecosystem services as secondary purpose if compatible • Identify and publicize incidental regulating services benefitting offsite communities

MULTIPLE USE	
EXAMPLES	• National forests • BLM lands • Suburban parks
FEATURES	• Balance and distribute different specified uses • Some uses may be incompatible • Each use often has a strong and vocal constituency • Extensive planning and process often required
ECOSYSTEM SERVICES	• Provisioning and regulating services often within scope of different uses • Managing for ecosystem services often within scope of governing authorities • Trade-off and scale issues likely to be faced
ADAPTIVE MANAGEMENT	• Useful for maintenance of continual balancing of uses • Most likely AM is within scope of governing authorities
STRATEGY	• Use AM where appropriate to balance uses • Use AM where appropriate to manage for ecosystem service goals • Identify and publicize regulating services benefitting offsite communities

DEVELOPED	
EXAMPLES	• Dense urban areas • Industrial zones
FEATURES	• Most surface area devoted to urban and industrial uses • Small pockets of stressed “natural” areas may exist (urban parks, stormwater ponds) • Land use decisions often highly contested
ECOSYSTEM SERVICES	• Most ecosystem services severely depleted • Almost no production of provisioning services • Pocket areas may provide limited regulating services
ADAPTIVE MANAGEMENT	• May be appropriate for managing complex land use system decisions • Unlikely to have sufficient control over pocket areas • Green infrastructure may present opportunities (see ENGINEERED)
STRATEGY	• Pursue green infrastructure • Identify and publicize regulating services benefitting the onsite communities

ENGINEERED	
EXAMPLES	• Constructed beach dunes • Wetland mitigation bank • Urban green infrastructure
FEATURES	• Extensive intervention to establish specific “ecosystem” state • Highly regulated in terms of requiring intervention and manipulation • Rising interest given climate change adaptation
ECOSYSTEM SERVICES	• Enhancing a specific regulating service often is the specific goal • Other ecosystem services flow incidental to management for specific goal
ADAPTIVE MANAGEMENT	• Useful for establishing and maintaining the “ecosystem” state • Most likely within the scope of governing authorities
STRATEGY	• Use AM where appropriate to achieve specific engineered outcome • Identify and publicize intended and incidental regulating services benefitting onsite and offsite communities

CONCLUSIONS

BOTTOM LINE: If you are interested in AM of ES to enhance regulating services and want to "make it so," understand your land use regime

- How much intervention authority exists?
- What ecosystem services are expressly required to be managed?
- Which regulating services can be "slipped in" under governing authorities?
- What process must be satisfied, particularly for trade-off decisions
- Fill out the chart, then move on to politics, money, and all the other fun stuff