

*Sub-divide and "Capture":  
Genesis of a de facto Zoning Policy  
in the Northeast Shelf LME*

*or  
Fencing Renewable Resources  
with Geo-Spatial Regulations*

Seminar presented at  
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# *Mia Culpa!*

- ✓ **No stakeholder group or claimant is criticized**
  - Dean Lueck (1998) explains that wealth “capture” and “first possession” are “[o]verwhelmingly, the chosen method by which rights [to common pool resources] are established both in custom and law” in the USA
  - Reporting on rational behavior
- ✓ **In policy, economics shares the spotlight**
  - Other disciplines might have reasons to favor exclusionary zoning as used on land
  - But the economic benefits of separating conflicting uses should not be taken for granted

# *Mia Culpa!*

- ✓ Ecologists are concerned about a scale mismatch between zoning (or other spatial management policies) and ecosystem function
  - o I can't speak to this concern justice, but it's something to keep in mind

## *Outline of Talk*

- I.** Popularity of zoning as a “technical fix” of spillovers (i.e., externalities)
- II.** Evidence of *de facto* zoning in the NER
- III.** Zoning as a property rights arrangement
- IV.** Contracting - an alternative to classical exclusionary zoning. Zones and uses evolve from property rights assignments and negotiations (not fiat)
- V.** Conclusions

# *I. Popularity of Exclusionary Zoning*

- ✓ **Widespread (not unanimous) support from:**
  - All levels of government
  - Academia (ecologists and social scientists)
  - Environmental organizations
  - Recent Commissions
  - Even fishing industry and the Councils
- ✓ **Recommended as either:**
  - An element of a resource allocation strategy (e.g., MPAs as part of an ecosystem approach)
  - A comprehensive plan to minimize spillovers, such as gear conflicts, bycatch, and adverse impacts to EFH

## *A sampling of support:*

- ✓ "... with industries from fishing to wind farms competing for a resource once seen as limitless, [the Massachusetts Ocean Management Task Force] will recommend zoning the ocean much like private land." (support from the CLF and MA Governor)
- ✓ "For EBFM, spatial zoning of the marine environment, including no-take marine reserves and areas where destructive fishing gears are prohibited, may become a prime management tool." (Babcock et al. 2005, p. 469)

## *Support, ctd*

- ✓ COMPASS urged governments to “[i]nitiate zoning of regions of the ocean ... for particular allowable uses in both space and time”
- ✓ In 1994, the Gear Conflict Advisory Comm. offered two resolutions:
  - separate areas by Loran lines, season, and depth for fixed gear, mobile gear, and drift gear
  - bands from shore based on vessel size, except west of  $-70^{\circ}W$  reserved for hook boats
- ✓ In 1996, the Groundfish Oversight Comm. (NEFMC) withdrew a proposal with 9 shared areas and quarterly gear closures

# *What's wrong with using exclusionary zoning in the ocean?*

- ✓ The three arguments behind ex. zoning:
  - a) The economic gains from minimizing spillovers by separating use-conflicts are assumed positive
  - b) It is an effective way to protect the environment
  - c) Public safety
- ✓ In practice,
  - a) Economic justification was criticized by economists who studied ex. zoning land
  - b) There appear to be less costly and equally effective options involving stakeholder choice
  - c) (not qualified to make comparison)

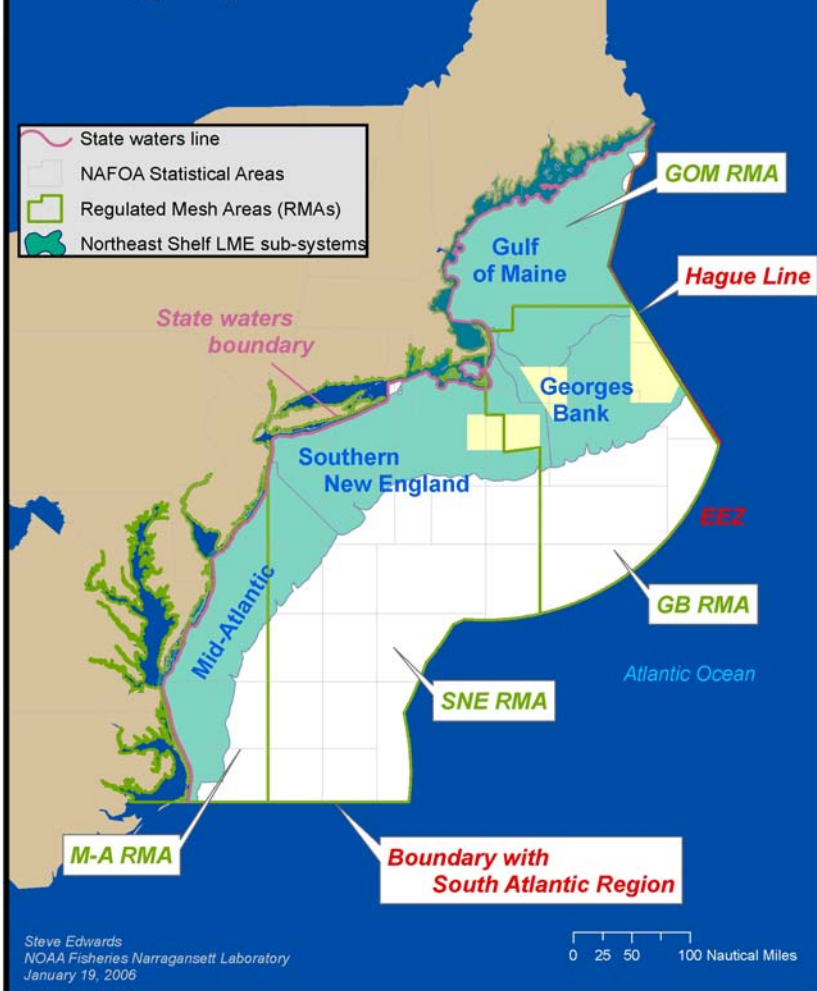


## *II. Evidence of de facto zoning*

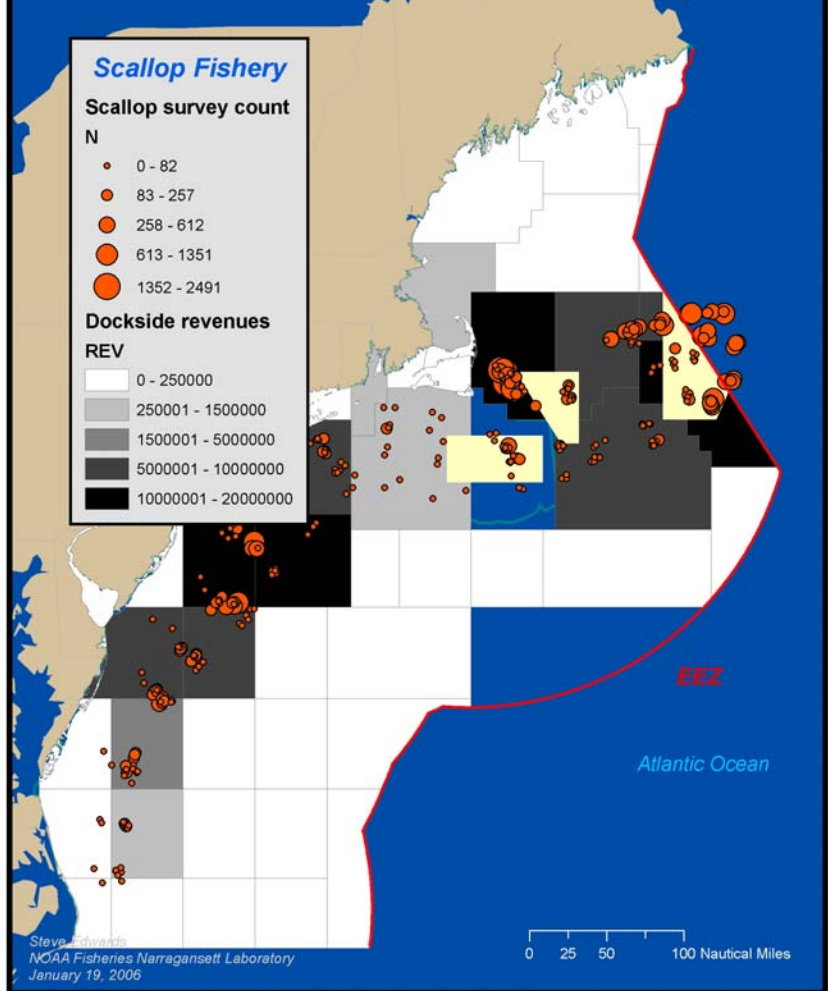
- ✓ Conventional views of the region's geography
- ✓ Several maps showing management areas with discussion of the types of regulations being used (emphasize exclusion or attenuation of activities that cause spillovers)

# Traditional Views of Regional Geography

A. Ecology, regulatory framework, and geo-political boundaries



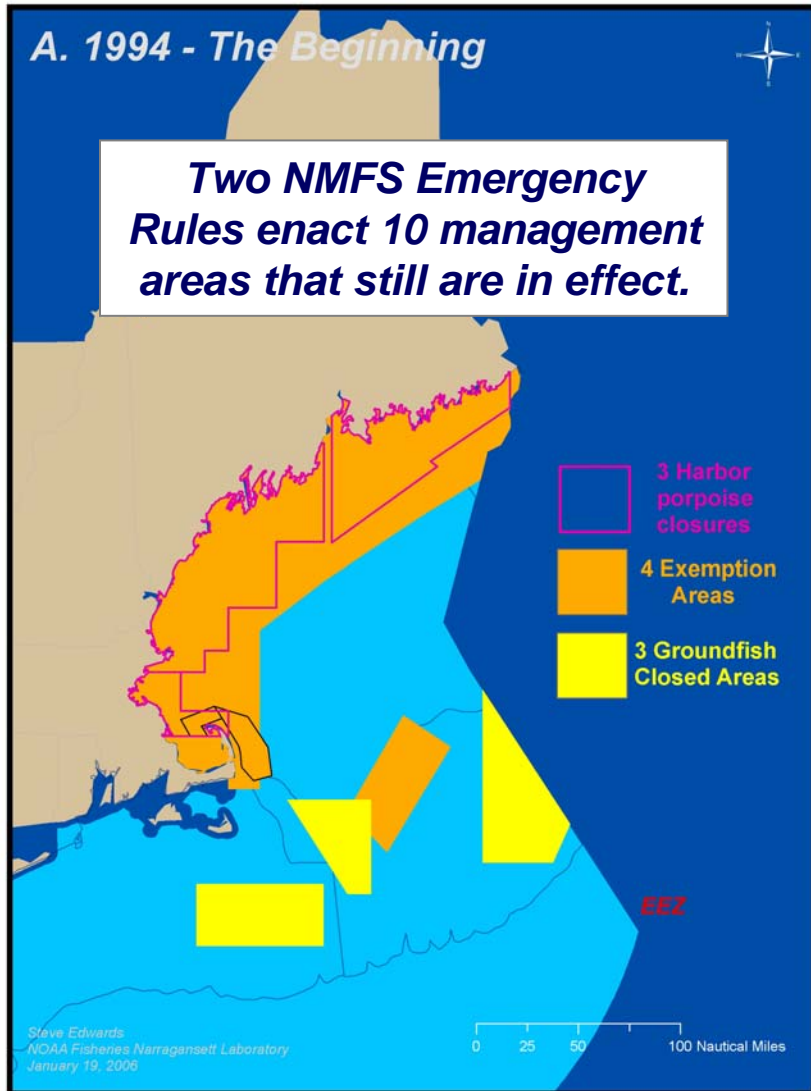
B. Sea scallop abundance and dockside revenues (1987-1993)



# Tradition has been changed ...

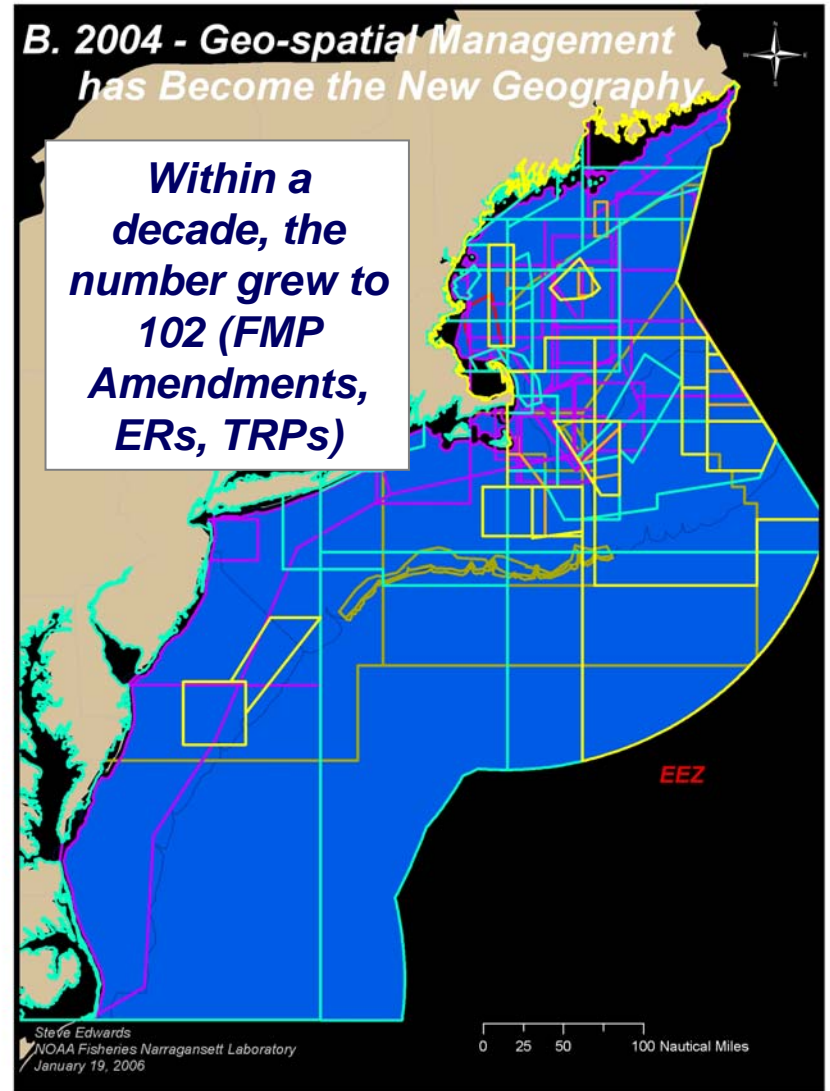
A. 1994 - The Beginning

**Two NMFS Emergency Rules enact 10 management areas that still are in effect.**

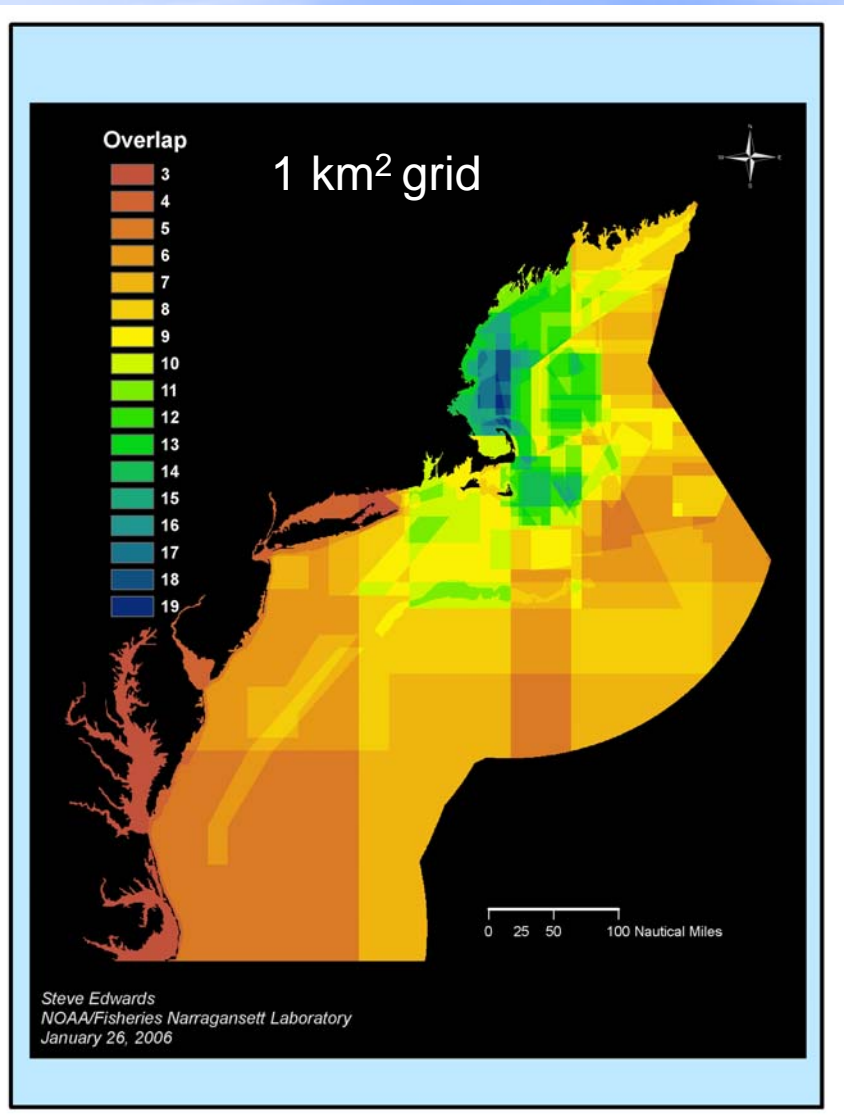


B. 2004 - Geo-spatial Management has Become the New Geography

**Within a decade, the number grew to 102 (FMP Amendments, ERs, TRPs)**



# A Rasterized View of Year 2004



- ✓ Entire region overlapped by a minimum of 3 and up to 19 management areas (ave. = 7)
- ✓ Most overlap within 100 nm of New England coast, especially in GOM
- ✓  $\Sigma$ areas = 3.5 million km<sup>2</sup>, or 7x federal+ state waters in region
- ✓  $\Sigma$ perimeters = 110,000 km, or 10x the circumference of the region's shoreline and EEZ

## *Loose Classification of Areas*

- ✓ Stock rebuilding (n=12)
- ✓ Exempted fisheries (n=32)
  - Bycatch of Atlantic cod and other “large-mesh” groundfish by s-m fisheries and other l-m fisheries is tightly controlled
- ✓ EFH habitat closures (n=7)
  - mobile bottom gear prohibited (except WGOM)
- ✓ Variety of marine mammal areas (n=35)
  - gillnet and lobster gear excluded/modified
- ✓ Allocation (ocean space, access to fish stocks, quotas, including SAPs) (n=15)
- ✓ MPA (n=1)

# *Regulations Seem to Serve Dual Purposes*

- ✓ Mandates of environmental laws to conserve and preserve living marine resources
- ✓ Can't ignore that 85% of 102 management areas further the interests of l-m groundfish fleets or environmental organizations by limiting the opportunities of other stakeholder groups that are generating spillovers
  - Notice that no property rights are being violated  
- their "crime" is spillovers

*Current regulations require spillovers to be "minimized". For example,*

- ✓ "Exempted fisheries ... using small mesh gear otherwise prohibited provided the bycatch of regulated [i.e., cod and other large-mesh groundfish] species is minimized ..."
- ✓ EFH habitat closures "minimize to the extent practicable adverse effects on such habitat caused by fishing ..."

## *Exclusions & Restrictions are the Regulations Used to Minimize- Some Ex*

- ✓ Initially most bottom fishing was prohibited from the 1994 groundfish and harbor porpoise closures
- ✓ Currently, "no vessel or person on a fishing vessel with bottom tending mobile fishing gear on board the vessel may enter, fish in, or be in the EFH Closure Areas"
- ✓ When access into ALW closure areas is permitted, lobster and gillnet fishermen must comply with a host of gear restrictions, such as diameter of lines, weak links, and pingers



# *Evidence that Stakeholders Support a de facto Zoning Approach and Resource Assignments ("capture/first possession")*

- ✓ 3 industry proposals mentioned above (see P. Clay 1996)
  - Groundfish Oversight Comm. in 1996 during Amendment 7
  - Gear Conflict Advisory Comm.
- ✓ Area-management popular with the New England Council
  - Closed areas have not demonstrated much success at rebuilding groundfish stocks (latest review is troubling), yet they persist and have increased in number ten-fold

## *Evidence/Support, ctd*

### ✓ Activities of environmental organizations and preference for closed areas:

- Lobbying and lawsuits
- Nomination of numerous HAPCs during EFH Omnibus Amendment 2 process
- MPA/marine reserves

### ✓ Consistent with the economic theory of regulation:

*"... as a rule, regulation is acquired by the industry and is designed and operated primarily for its benefit." Stigler (1982)*

### *III. Zoning is a geo-spatial property rights regime ...*

- ✓ **Definition:** A government sanctions specific uses and users inside an area, and either excludes or restricts other uses that cause spillovers
  - E.g., Special Access Programs: growing number of narrowly-defined fisheries prosecuted inside/nearby groundfish closed areas available only to people w/ groundfish limited access permits and subject to several restrictions
- ✓ **Examples of spillovers:**
  - Takes of protected species; regulatory bycatch; gear conflicts; adverse effects of fishing gear on EFH; diminution of ecological diversity; diminution of gene pool; "Your" fish eats "my" fish

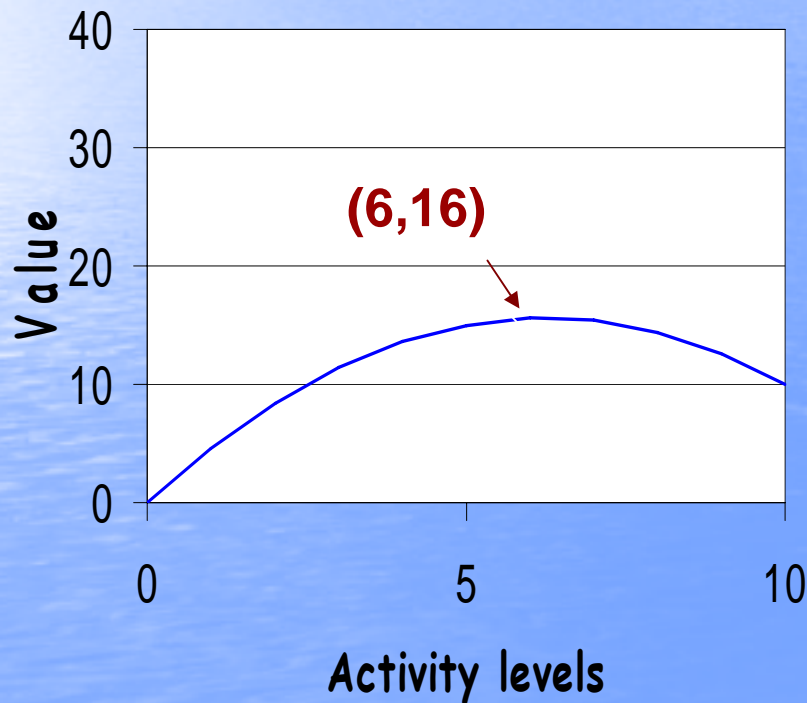
## *So why doesn't it make "cents" to use exclusive zoning to eliminate spillovers?*

- ✓ For the same reason we are not required to drive zero-emissions cars: the (opportunity) costs are too high.
  - Opportunity costs are losses of value, not transfers or monetary expenses
- ✓ One litmus test requires gains from spillover reductions to exceed costs of enforcement, but there's more to consider:
  - Forgone value of production or capital (market, environmental, social, cultural) when excluding or restricting spillover activities
  - "Rent-seeking"

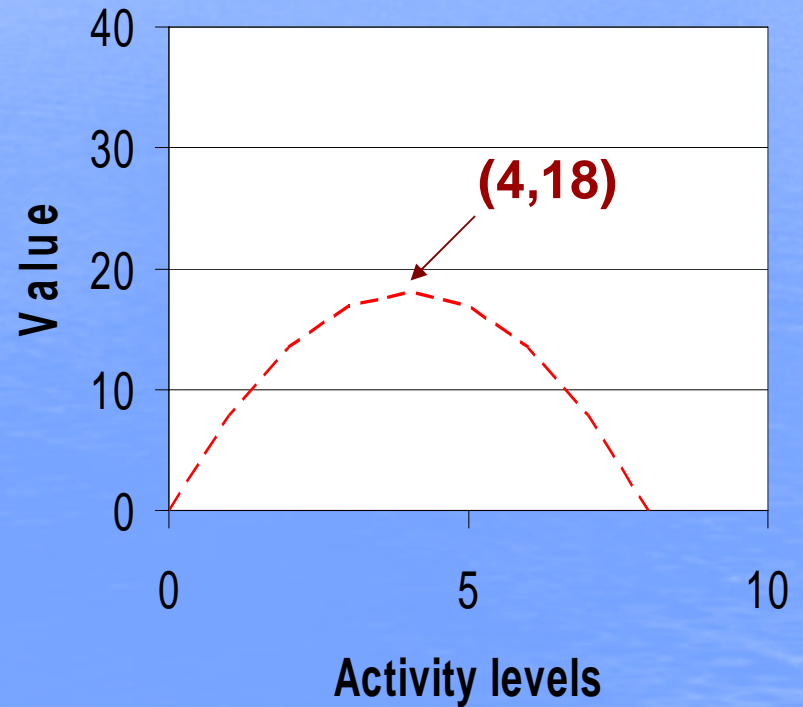
# *Forgone Value: Maximize aggregate gain, not minimize spillover losses*

Assume that Use 1 causes heavy spillovers that harm Use 2.

Area Used Only by Use 1

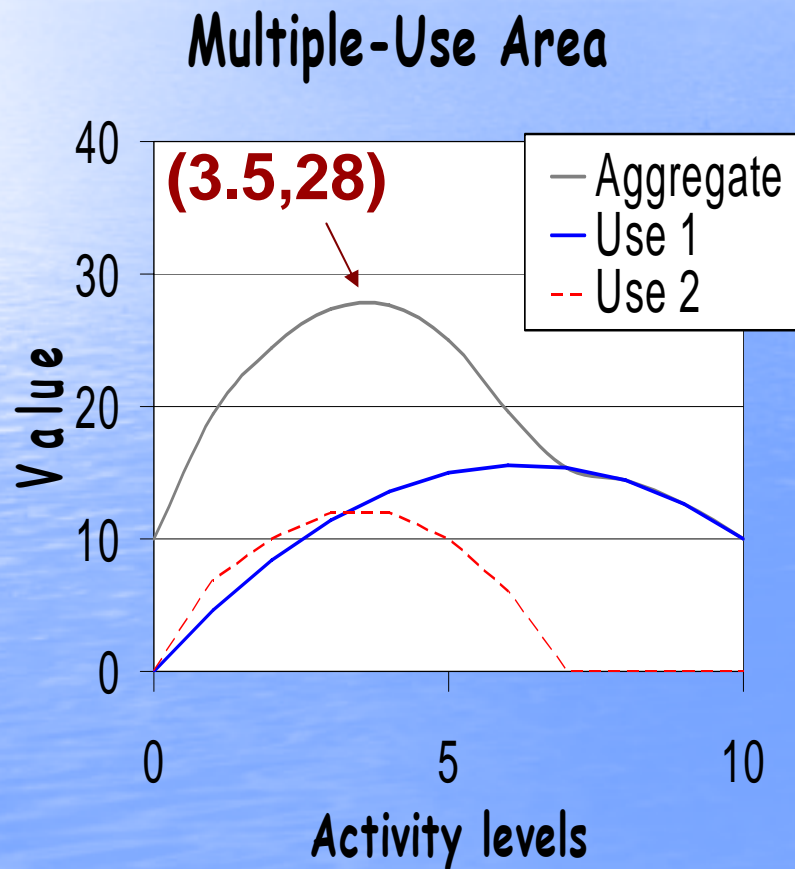


Area Used Only By Use 2



Looks like excluding, or significantly attenuating, Use 1 from the area makes economic sense.

# Forgone Value (Use 1 Causes Spillovers Affecting Use 2)



But value is actually maximized at 28 in the multiple-use case where both activities co-exist and the spillover is internalized, even though the value of Use 2 is diminished. Under the right circumstances, there might be incentives and opportunities to reduce spillover damages and increase aggregate value.

# *Circumstances that Might Favor Single-Use or Protection (on Economics Grounds)*

- ✓ **Spillover damages >> foregone production**
  - Very scarce and no close substitutes
  - Fragile and takes many years to recover
  - Uncertain future uses, but exploitation is irreversible (quasi-option value)
- ✓ **Transaction costs of multiple use >> foregone production AND technologies are too highly specialized to be bundled**
  - Spillovers are continuous, but poorly understood; therefore information costs alone are too high

## *Rent-seeking?*

- ✓ Rent is ... let's just say above-normal income attributable to a factor's unusual quality or advantage.
  - Golf earnings: Tiger Woods > other pros > college scholarship > local tournament prizes
- ✓ Rent-seeking: Businesses, NGOs, etc. seek "licenses, permits, or other entitlements" from government that result in rents.
- ✓ Generally considered a zero-sum game because costs increase with the number of rent-seekers, but production stays the same



## *Rent-seeking for natural resources probably more costly in the ocean*

- ✓ On land, ownership generally is more secure and/or less costly to enforce
- ✓ In the ocean, considerable wealth exposed in the public domain attracts attention:
  - Cost of information and enforcement too high for government to establish full ownership of LMRs
  - Many attributes of common pool resources are unregulated (e.g., spatial distribution of stocks, predator-prey interaction, etc)
  - Prime conditions for “capture” of rents and/or “first possession” of asset

## *Rent-seeking, ctd*

- ✓ Spillovers commonplace (uses co-mingled by physical location, technology, and ecology), and stakeholders demand protection from the “landlord”

## *IV. Contracting - substitute regulations with negotiations*

- ✓ Cheung (1970; p. 50) stressed contracting long ago:
  - “[t]he alleged “externalities” in fisheries are thus attributable to the absence of the right to contract”.
- ✓ Without secure property rights to exchange, “transaction costs” faced by stakeholders who are trying to resolve spillovers usually are insurmountable
  - Assuming some can agree, anyone else can undermine the result

# *A few examples where contracting is used - EVERYWHERE!*

- ✓ The business world operates with contracts.  
In fisheries,
  - Relatively fast agreements reached by harvest cooperatives (2 days or less versus years)
  - Associations formed by owners of ITQs, especially in other countries where the ITQ is a harvest right and not just a privilege
- ✓ I assume that commons work similarly with formal, if not legal contracts (with apologies to G. Hardin)

*Can environmental organizations negotiate contracts? Of course, lawyers work there.*

✓ The Nature Conservancy negotiates with private land owners, and local and foreign governments to preserve biodiversity and habitat around the world

- It now has a new coastal initiative with property rights as a centerpiece
- It has also joined EDF in Alaska in a negotiation with the FMC to buy excess capital in the groundfish fishery in return for a large marine area designated as a reserve

## *Can environmental organizations negotiate contracts? (ctd)*

- ✓ Audubon's Rainey Wildlife Sanctuary (Lee 2001):
  - received \$25 million in royalties (as of 1995) from oil & gas leases, but opposes oil production on the shelves
  - faces opportunity costs at Rainey but not elsewhere
  - incentives matter!

## *What might the contracting alternative look like?*

- ✓ System of harvest rights that is comprehensive (all resources allocated to claimants) and complete (exchange, duration)
  - Also recommended by others to reduce excess and costly fishing capital
- ✓ Spatially-defined (facilitate negotiations)
- ✓ Distributed governance (Townsend and Pooley 1995)
  - government facilitates exchange by transferring harvest rights, but also participates in negotiations to design rules, protect public safety, promote public goods, enforcement, ...

# *General types of contracts (Coase 1960)*

- ✓ Area is single-use (but it took exchange contracts to get there)
  - spillover or transaction costs are too high
  - resource is valued highly (e.g., research areas, bio-prospecting, etc)
  - reserved by government
- ✓ Subset of uses contracted a way to coexist, but ownership remains divided, and contracts stipulate compensation (e.g., Flower Gardens Reef and Texaco?)



## *General types of contracts, ctd*

- ✓ Also multiple-use contract, but spillovers are internalized by bundled ownership (e.g., any number of fisheries connected by regulatory bycatch or predator-prey interactions - a portfolio)
- ✓ Multiple-use contract that initially results in bundled ownership, but leads to divided ownership of some of the rights because technologies are specialized (e.g., oil production on Rainey). Some production rights are sold or leased subject to contractual stipulations.

## *Conclusions: The New Regulatory Geography in the Northeast Region*

- ✓ Area closures are used extensively by managers as a conservation tool. More areas were added in 2005, especially EFH-related areas won by environmental groups.
- ✓ The spatially explicit regulations to minimize spillovers are zoning waters incrementally. Exclusion from areas where l-m groundfish, EFH, or marine mammals are being protected, and restrictions on fishing gear or access are common regulations.

## *Conclusions: You Made It (almost)!*

- ✓ I'd expect the nation and general public to get a relatively low economic return from their ownership of renewable resources if the region adopts exclusive zoning (rent-seeking, foregone production)
- ✓ Contracting can also allocate resources spatially into zones while improving returns:
  - Possibility requires comprehensive system of secure and transferable harvest rights (preferably spatially-defined to further decrease transaction costs) - DAPs won't work
  - The fishing industry has already made 3 zoning proposals
  - Contracting could extend to other resource sectors

## *Conclusions: Now You Made It!*

- ✓ **Relationship to the Ecosystem Approach?**
  - The EA adds spatial heterogeneity to the list of resource attributes being managed (i.e., stock biomass and age structure) and focuses attention on placed-based management.
  - All EA strategies include marine reserves, and several discuss matching gear or technology in general to habitat characteristics
  - Have interactions and uncertainty (especially information) in common.
- ✓ **Ownership is a legal “bundle of sticks”; the federal government does not have to transfer all of its ownership rights for contracting to work. It keeps a seat at the bargaining table.**