

12/4/87

PROPERTY RIGHTS IN THE RESOURCE AND TO THE FLOW:  
A CONFIGURAL ANALYSIS

by

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In analyzing common property resources a distinction that proves to be very useful in analysis is the difference between the resource from which units are withdrawn, and the flow of units themselves (Blomquist and Ostrom 1985, Ostrom 1986). In a coastal fishery, for example, the fishing ground is the resource and the fish are the flow of units withdrawn. Different sets of rights and duties are frequently developed in relation to the resource itself and to the flow of units through it. In the case of a resource, individuals or collectivities define property rights such as access, withdrawal, and exclusion, which set the stage for the development of rights in the flow of units. In the case of coastal fisheries, these rights of flow often take the form of rights to withdraw fish at particular spots within the resource, rights to a specific number or proportion of fish, or rights to withdraw fish during specific seasons. In other words, property rights to the resource define individuals' rights to the resource as against the rest of the world, whereas rights to the flow of units define the rights of individual appropriators to the flow as against other appropriators within the same resource.

In this section I will first examine property rights to resources and the consequences that arise from differing bundles of rights. Next I will examine property rights to the flow of units within a resource and how they might differ under various systems of property rights to the resource. Finally, before moving on to an analysis of actual case studies, I will examine private and nested ordering systems which support and protect both sets of rights.

Property Rights to the Resource.

Property regimes rest upon rights and duties which are defined by rules.<sup>1</sup> John R. Commons, in Legal Foundations of Capitalism (1968), describes rights and duties and the relationships between them. Rights and duties order actions among individuals. A right is the authority to undertake particular acts. The correlative of a right is a duty to act in accordance with the right being asserted. In addition, Commons argues that limits exist to both rights and duties. Where individuals' rights end, their exposures begin. Exposure is the area of decisionmaking where individuals cannot assert or enforce rights. The correlative of exposure, or the limit of a duty, is liberty. This is an area of decisionmaking where the individual is under no duty, but is at liberty to act (see V. Ostrom 1976).

Property rights, then, refer to an array of rights, or authority that individuals or collectivities may hold in relation to a resource. Five basic rights can be defined related to a resource. They are the following:

- Access: The right to enter a defined physical property.
- Withdrawal: The right to obtain the "products" of this resource (e.g., catch fish, appropriate water, etc.).
- Management: The right to regulate internal use patterns and transform the resource by making improvements.
- Exclusion: The right to determine who will have access to a resource or a share thereof.
- Transfer: The right to sell, lease, or bequeath all of the above rights in whole or in part.

Five legal positions exist, depending on the bundle of rights the

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<sup>1</sup>This section draws heavily on Schlager and Ostrom (1987).

position includes. These positions are owner which entails all five rights; proprietor which entails all rights except for that of transfer; claimant which includes access, withdrawal, and management; authorized user which includes access and withdrawal; and squatter which entails no rights in a resource.

Bundles of Rights Associated with Positions

<u>Owner</u>	<u>Proprietor</u>	<u>Claimant</u>	<u>Authorized User</u>	<u>Squatter</u>
Access	Access	Access	Access	No Rights/ Only-
Withdrawal	Withdrawal	Withdrawal	Withdrawal	Exposures
Management	Management	Management		
Exclusion	Exclusion			
Transfer				

The exact bundle of rights which will ensure the efficient use of a resource depends on at least two basic factors--the physical size and location of the resource, and patterns of demand for the units the resource produces. Each of the five rights a group of appropriators may hold in a resource need not always be explicitly granted or rule based. A resource may be remote enough from population centers that a right of exclusion is not necessary. Or a resource may be sufficiently remote from administrative centers that a right of management need not be formally granted. In addition, given a resource system and a pattern of demands that are relatively well matched, users or appropriators of the resource may, with only the rights of access and withdrawal, engage in efficient appropriation.

As the level of demand for the resource units increases, however, the need for a more complete bundle of rights also increases. A more complete bundle of rights gives appropriators greater authority to make decisions in relation to the resource such as who may access the resource and how the resource is to be utilized, thereby potentially avoiding a "tragedy of the commons" scenario.

Property Rights to the Flow of Units.

While providing individuals with more complete sets of rights in resources does not mean that they will necessarily act to further order their transactions in relation to the use of the resource, these rights do provide a more secure context within which such activity can take place. As Runge argues, "By providing security of expectation property institutions are responses to the uncertainty of social and economic interaction." (Runge 1986:630). The rights of access, withdrawal, management, and exclusion, limit the appropriators' exposure to the actions of others, thereby providing incentive both to craft additional structures which order transactions among individual appropriators within a resource and to undertake further investments of time, information, and capital to better utilize the resource.

For example, with the relatively full bundle of rights proprietors possess, they have the incentive to craft safeguards, or rights to the flow of units within the resource, given their rights of access, withdrawal, and management; while with the right of exclusion they have the incentive to craft mechanisms that will protect their rights in the resource from outside intruders. In other words, the actions of proprietors, given their bundle of rights, stand little exposed to the activities of others. They can craft additional rights

or safeguards and various monitoring systems which assist them in efficiently utilizing the resource.

The legal stature of the authorized user stands in sharp contrast to that of the proprietor. The authorized user possessing only the rights of access and withdrawal, and lacking the rights of management, exclusion, and transfer, has little authority in relation to other users and lots of exposures to others' actions. The authorized user, therefore, possesses little incentive to undertake additional activities that would define rights to the flow of units within the resource, or monitoring systems to protect those rights. Since the authorized user cannot exclude others from the resource or cannot make decisions about the utilization of the resource, any actions that an authorized user would take to further define transactions in relation to the resource stand exposed to the actions of others, possibly proprietors or claimants who hold more complete bundles of rights.

Structures which order relations among appropriators within a resource often take the form of some type of property rights in the flow of units in the resource. In the case of fisheries these rights are several. The right to fish in a particular spot within the fishing ground to the exclusion of other fishers; the right to appropriate a fixed number or proportion of fish; the right to withdraw *certain* types of fish of a particular size; and the right to appropriate fish during particular time periods.

These rights in flow have the potential to protect different types of assets which appropriators have invested in a resource. Assets, such as specialized knowledge of the fishing ground, or specialized fishing equipment, are protected when the certainty of

other people's actions is increased as a result of these rights. By giving a fisherman rights to particular spots for a defined period of time in the fishing ground, he can utilize his knowledge of the grounds to take advantage of the more productive locations available to him. In addition, his investment in equipment is more secure, as he has a right to use a particular spot and others have a duty to permit him to exercise that right. Utilizing his equipment in that spot, the fishermen need not fear its destruction.

These rights to the flow may also lessen conflict and promote fairness among fishers, which enhances the security of fishers. For example, if only a limited number of productive spots exist within a fishery, first come, first serve behavior can generate high levels of conflict. In such a case the same fishers may claim the same spots year after year, or fishers may engage in destructive behavior as they scramble to gain the most productive spots first. Establishing rotation or lottery systems which invest fishers with secure rights in a spot or series of spots lessens conflict and promotes fairness. A rotation system permits fishers to take turns accessing the most productive areas, while a lottery gives all fishers an equal chance of being assigned the most productive area.

By developing rights in the flow of units in a resource security of expectation in relation to others actions is developed, while simultaneously promoting and protecting assets invested in the resource. These rights to the flow are likely to be developed by appropriators only if they hold relatively full bundles of rights to the resource itself. Only then can they reap most of the benefits of the more developed rights to the flow, since those acts are not

exposed to the actions of others. The rights that appropriators have both in the resource and in the flow of units through the resource, however, are only meaningful if the appropriators can enforce these rights.

#### Monitoring and Enforcement Systems.

John R. Commons, in addition to describing the relationship between rights and duties, argues that a right is meaningless unless the individual holding the right can enforce it. (Commons 1968:84) While Commons speaks in terms of superior third parties enforcing these rights, these third parties can be mechanisms which the individuals to a transaction specify as having the authority to settle disputes or realign relations, which for whatever reason have become unaligned. In other words, these third parties need not be external formal courts, but may be some type of arbitrator or even groups of peers.

In relation to the two above mentioned sets of rights often times two distinct types of monitoring and enforcement systems arise/exist in support of each. In the case of rights in the resource, monitoring systems which survey the actions of outsiders are often established by the appropriators themselves. Fishers as they work in coastal fisheries are in an excellent position to monitor the boundaries of their resource. While much monitoring is undertaken by fishermen, actual enforcement activities may be carried out by either the fishermen, some external authority, or both. In cases where a formal governmental authority has not granted these rights and the fishers themselves have established them the fishers carry out the enforcement (Acheson 1975). Where a formal governmental authority has granted or



at least recognizes the fishers rights to the resource, enforcement activities are often undertaken by both the fishers and an external authority. In either case, rights in the resource are supported by monitoring and enforcement systems.

In the case of rights to the flow of units, monitoring and enforcement activities often rest more squarely with the appropriators of the resource. As appropriators develop rights in the flow amongst themselves, they also create or extend the scope of existing monitoring and enforcement systems. Although these endogenous ordering systems vary in form over time and space they do share basic characteristics. First, monitoring is often done by the fishers themselves. If a fisher has rights in a spot for a specific period of time and the spot is productive, he will be on the water ensuring that spot is open during his time period. Or, if fishers are assigned fish quotas, the fishers can easily monitor each other as they bring their catch ashore to the local wharf. Second, enforcement of the rights to the flow is often community based. Conformity to the rights of others entails social sanctions meted out at the local coffeehouse, or through a collection of appropriators who mediate between the aggrieved party and the offender, ensuring that the wrong committed is put right, and also smoothing social relations to prevent the outbreak of continuous open conflict.

As appropriators are vested with increasingly more complete bundles of rights in a resource, a context is established in which the appropriators have both the authority and the incentive to further order their transactions in the resource in relation to each other. The result is the development of rights in the flow of units within a

resource which provide security of expectation in relation to the actions of others. Both sets of rights, those in the resource and those in the flow are in turn supported by nested and endogenous enforcement systems. What follows is a series of case studies which illustrate and support the above theoretical argument.

## CASE STUDIES

	<u>Alanya</u>	<u>Ermeuse</u>	<u>Jambudwip</u>	<u>Kampong Mee</u>
<b>RIGHTS IN RESOURCE</b>				
Access	Y	Y	Y	Y
Withdrawal	Y	Y	Y	Y
Management	Y	Y	Y	N
Exclusion	N	Y	N	N
Transfer	N	N	N	N
<b>RIGHTS IN FLOW</b>				
Quotas	N	N	N	N
Rights in spots	Y	Y	Y	N
Rights in season	N	N	N	N
Rights in type	Y	Y	Y	N
<b>MONITOR + ENFORCEMENT</b>				
<b>Endogenous</b>				
Monitor Boundaries	N	Y	N	N
Monitor Internal	Y	Y	Y	N
Enforcement	Y	Y	Y	N
<b>Nested</b>				
Monitor Boundaries	N	N	N	N
Monitor Internal	N	N	N	Y
Enforcement	N	Y	N	Y
<b>CHARACTERISTICS OF RESOURCE</b>				
Isolated	Y	N	Y	N
High Demand by Outsiders	N	N	N	Y
Spatial Heterogeneity	Y	Y	Y	N

Table 2. Frequency of Boundary Rules Among Subgroups.

<u>Boundary Rules</u>	<u>Subgroups that utilize the rule</u>
Residency	22
Gender	23
Use of particular technology	16
Membership or Own Shares in Organization	10
Race/Ethnicity	1
License	5
Own Land in Location	3
Own Fishing Equipment	3
Lotteries.	3
Demonstration of Fishing Skills	2
Continuous Usage of Fishing Grounds	2

TABLE 3. RIGHTS HOLDERS & AUTHORITY/SCOPE RULES

RIGHTS HOLDERS

<u>AUTHORITY/ SCOPE RULES</u>	<u>AUTHORIZED USERS</u>	<u>CLAIMANTS</u>	<u>PROPRIETORS</u>
None	67% (4)	14% (1)	0% (0)
One	33% (2)	57% (4)	59% (10)
Multiple	0% (0)	29% (2)	41% (7)

Gamma = .77

Table 4 Length of Use of Fishing Grounds Among Subgroups that Have Organized Appropriation.

<u>Length of Use</u>	<u>Frequency</u>
1-10 years	2
11-25 years	2
26-50 years	3
51-75 years	1
76-100 years	4
101-200 years	6
201-300 years	2
301-500 years	1
501-1000 years	1
1000+ years	1

Average = 101-200 years

Mode = 101-200 years

Table 51. Frequency of Monitoring Systems Within Resources Where Subgroups Have Organized Appropriation.

<u>Monitoring System</u>	<u>Frequency Among Subgroups</u>
No Guards or Monitors	0
Self-Monitor Only	12
Guards Only	2
Both	3
No information about monitoring systems	3

Table 6. Frequency of Sanction Systems Within Resources Where Subgroups Have Organized Appropriation.

<u>Sanction System</u>	<u>Frequency Among Subgroups</u>
No Sanctions	0
Physical Sanctions Only	0
Social Sanctions Only	7
Guard Sanctions Only	3
Social Sanctions and Physical Sanctions	3
Insufficient Information About Sanction Systems	6



## Appendix 1.

### Resource Characteristics

- \* Not enough information on surface area
- \* Variation over space in availability of units: (by resource)
  - $\frac{23}{23}$  or 100% of resources characterized by considerable variation
- \* Predictability of space variation (by resource)
  - $\frac{16}{23}$  or 70% space variation generally predictable
  - $\frac{6}{23}$  or 26% space variation generally unpredictable
  - $\frac{1}{23}$  or 4% MIC
- \* Variation in flow within year (by resource)
  - $\frac{22}{23}$  or 96% of resources characterized by considerable variation in flow in yr
  - $\frac{1}{23}$  or 4% MIC
- \* Predictability of flow within year (by resource)
  - $\frac{17}{23}$  or 74% of resources flow variation in year is generally predictable
  - $\frac{4}{23}$  or 17% of resources flow variation in year is generally unpredictable
  - $\frac{2}{23}$  or 9% MIC
- \* Variation in flow from year-to-year (by resource)
  - $\frac{21}{23}$  or 91% flow from year-to-year is considerable
  - $\frac{1}{23}$  or 4% flow from year-to-year is not considerable
  - $\frac{1}{23}$  or 4% MIC
- \* Predictability in flow from year-to-year (by resource)
  - $\frac{20}{23}$  or 87% flow from year-to-year is unpredictable
  - $\frac{3}{23}$  or 13% MIC or Not Applicable
- \* Fugitive vs. stationary units: (by resource)
  - $\frac{4}{23}$  or 17% of resources entail stationary units
  - $\frac{19}{23}$  or 83% of resources entail fugitive units

# Appendix 1 continued

## Appropriator Characteristics

### \* Numbers of appropriators (by operational level):

- 9/23 or 39% 100 or fewer appropriators
- 5/23 or 22% 101 - 200
- 4/23 or 17% 201 - 300
- 2/23 or 9% 301 - 400
- 3/23 or 13% 400 +

### \* Gender differences among appropriators (by operational level):

- 20/23 or 87% appropriators are male
- 2/23 or 8% appropriators are male + female
- 1/23 or 5% MIC

### \* Racial differences among appropriators (by operational level):

- 20/23 or 87% no racial differences among appropriators
- 3/23 or 13% racial differences among appropriators

### \* Language differences among appropriators (by operational level):

- 23/23 or 100% no language differences

### \* Manner in which appropriators related to each other (by operational level):

- 17/23 or 74% appropriators related in positive-reciprocal manner
- 3/23 or 13% appropriators related in quid-pro-quo manner
- 3/23 or 13% appropriators related in negative spiteful manner

### \* Cooperation in relation to other things besides resource (by operational level):

- 19/23 or 83% appropriators cooperated in relation to other resources or other activities or both
- 1/23 or 4% no cooperative activities
- 3/23 or 13% MIC

### \* Levels of mutual trust (by operational level):

- 17/23 or 73% appropriators have high levels of mutual trust
- 2/23 or 9% appropriators have modest levels of mutual trust
- 2/23 or 9% appropriators have low levels of mutual trust
- 2/23 or 9% MIC

## Appendix 1 continued

### Appropriator Characteristics (continued):

- \* Appropriators dependence on resource for income (by subgroup):
  - $\frac{22}{30}$  or 73% appropriators receive most family income from resource
  - $\frac{6}{30}$  or 20% appropriators receive about half of family income from resource
  - $\frac{2}{30}$  or 7% MIC

### Appropriator Information About Resource

- \* Use units provide rapid feedback about condition of resource (by subgroup):
  - $\frac{28}{30}$  or 93% units provide rapid feedback
  - $\frac{2}{31}$  or 7% MIC

- \* Appropriators knowledge of resource: (by operational level)
  - $\frac{19}{23}$  or 82% appropriators have intimate knowledge of resource
  - $\frac{2}{23}$  or 9% appropriators have considerable knowledge of resource
  - $\frac{2}{23}$  or 9% appropriators moderately familiar

- \* Appropriators reside in or adjacent to resource: (by subgroup)
  - $\frac{21}{30}$  or 90% of subgroups, 91-100% of members reside near resource
  - $\frac{4}{30}$  or 7% of subgroups, 76-90% of members reside near resource
  - $\frac{1}{30}$  or 3% of subgroups, less than 10% of members reside near resource

- \* Appropriators readily observe each other: (by operational level)
  - $\frac{4}{23}$  or 17% appropriators see each other withdrawing units
  - $\frac{3}{23}$  or 13% appropriators see each other delivering harvest
  - $\frac{16}{23}$  or 70% appropriators see each other doing both

- \* Records of withdrawals kept (by operational level):
  - $\frac{3}{23}$  or 13% no records of withdrawal kept
  - $\frac{18}{23}$  or 78% records usually kept
  - $\frac{2}{23}$  or 9% MIC

Property Rights of Subgroups (Appendix 2)

<u>Resource</u>	<u>Access</u>	<u>Withdrawal</u>	<u>Management</u>	<u>Exclusion</u>
10256.1	+	+	-	-
10166.1	+	+	-	-
10151.1	+	+	-	-
10167.1	+	+	-	-
10164.1	+	+	?	-
10309.1	+	+	?	-
10165.1	+	+	+	-
10169.1	+	+	+	-
10169.1	+	+	+	-
10164.1	+	+	+	-
10300.1	+	+	+	-
10429.1	+	+	+	?
10159.1	+	+	+	+
10159.1	+	+	+	+
10433.1	+	+	+	+
10258.1	+	+	+	+
10258.1	+	+	+	+
10255.1	+	+	+	+
10246.1	+	+	+	+
10246.1	+	+	+	+
10168.1	+	+	+	+
10123.1	+	+	+	+
10432.1	+	+	+	+
10154.1	+	+	+	+
10125.1	+	+	+	+
10124.1	+	+	+	+
10109.1	+	+	+	+
10101.1	+	+	+	+
10101.1	+	+	+	+

Coefficient of Reproducibility: 1.0

Appendix 3. Summary Description of Authority/Scope Rules  
(at the levels of local collective choice or rules-in-use)

\* Nine subgroups utilize more than one authority/scope rule

- one subgroup uses:
  - fixed time slots      specific locations
  - fixed order            minimum size
- three subgroups use:
  - specific seasons      specific locations
  - minimum size
- two subgroups use:
  - fixed order            specific locations
  - minimum size
- two subgroups use:
  - minimum size          specific locations
- one subgroup uses:
  - specific seasons      specific locations

\* Sixteen subgroups utilize one authority/scope rule: specific locations

Appendix 4.

Resource	Property Rights			Rules		Consolidation		Consistency ( - means no, + means yes)
	Access	Withdraw	Manages	Exclude	open access	authority scope	Balance	
10256.1 (47.2)	+	+	-	-	-	-	-	+
10166.1 (24.0)	+	+	-	-	-	-	-	+
10164.1 (32.1)	+	+	?	-	-	-	-	+
10309.1 (70.1)	+	+	?	-	-	-	-	?
10256.1 (48.2)	+	+	+	-	-	-	-	+
10167.1	+	+	-	-	+	+	+	-
10153.1	+	+	-	-	+	+	+	+
10164.1	+	+	+	-	+	+	+	+
10164.1	+	+	+	-	+	+	+	+
10169.1	+	+	+	-	+	+	+	?
10165.1	+	+	+	-	+	+	+	?
10109.1	+	+	+	+	+	+	+	-
10246.1	+	+	+	+	+	+	+	?
10246.1	+	+	+	+	+	+	+	?
10433.1	+	+	+	+	+	+	+	+
10432.1	+	+	+	+	+	+	+	+
10154.1	+	+	+	+	+	+	+	-
10258.1	+	+	+	+	+	+	+	-
10159.1	+	+	+	+	+	+	+	-
10159.1	+	+	+	+	+	+	+	-
10255.1	+	+	+	+	+	+	+	-
10168.1	+	+	+	+	+	+	+	?
10123.1	+	+	+	+	+	+	+	+
10300.1	+	+	+	+	+	+	+	-
10424.1	+	+	+	+	+	+	+	-
10125.1	+	+	+	+	+	+	+	-
10124.1	+	+	+	+	+	+	+	-
10121.1	+	+	+	+	+	+	+	?
10121.1	+	+	+	+	+	+	+	?

⊖ No fish

⊕ Foreman