

Petty Harbor Cod Fishery

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1 Part I: Static Analysis - Collective Action

The Petty Harbour Cod Fishery is based out of Petty Harbour, Newfoundland, Canada. The original case includes empirical evidence collected from the field in 1971. The case was updated in 2020 with information collected from the field in thesis.

1.1 The Commons Dilemma

The Canadian government is the formal owner of the resource, with a well-defined set of individuals, fishermen, who have rights to withdraw from this resource. During the initial study period, appropriators were attempting to exercise de facto closed access to this resource, but during the study period “outsiders” began to appropriate at a moderate level. The resource abundance declined slightly during this period (inferred).

1.2 Biophysical Context (IAD)

- **Natural infrastructure:**

The fishery is located off the northeast coast of the Avalon Peninsula and includes Motion Bay and the coastal areas extending from the Bay. Petty Harbor is located 15 km from the city of St. John's. The primary fishery resource is Northern Cod (*Gadus morhua*), a renewable resource harvested for local use and for export. Salmon, lobster, squid are a secondary resource harvested primarily during the off-season. Both fisheries are biologically produced, renewable moving (fugitive) units subject to subtractability. This subgroup appropriates 26-50 percent of its total appropriated units at the end of this period (educated guess).

There are distinct and stable micro-environmental or ecological zones within this resource. The quality and/or quantity of units is regularly better in some of the zones than in others. The variance in quality between the zones has at some point in time created conflict among appropriators. There are strategic points within the resource where the main flow of the cod can be controlled. There is considerable, and predictable variation over space in the availability of cod within the resource. There is considerable, and mildly predictable variation in the flow of cod within a single year and from year to year. During the course of the study period, the quality of the units being withdrawn from the resource went from high (educated guess) to passable (educated guess).

1.3 Attributes of the Community (IAD)

As of 1973, a permanent population of 1,000 residents lived year round in Petty Harbor. During the study time period, the economy was stable and tied to other economic networks. The subgroup has regularly appropriated from this resource for since the late 1600's years. Most people in this subgroup are very dependent (i.e. most of the family income) on this resource. The number of fishermen involved in this fishery has declined substantially since 1921.

Petty Harbor has historically been separated by religion, with Catholics and Protestants residing on separate sides of the harbor, attending separate schools, fishing separately, and not intermarrying. These two religious subgroups cooperate in times of crisis.

Fishing has historically been a male activity, with women comprising the large majority of fish plant workers. Most appropriators enter the fishery in their teens, usually without completing high school.

There are approximately 50 total appropriator teams of two or three-person crews (101-200 individuals), appropriating from the resource, comprising 29 percent of the labor force (1971). Many of these crew members are part-time or casual appropriators with employment outside the fishery. The fishing population in 1973 was divided into two groups: those that handline exclusively from June to November and those that operate traps from June to August and handline from August to November. Additionally, about 50 percent of the trapping teams harvest salmon for 5 weeks until the cod fishery opens in June.

The Petty Harbor appropriators are inshore fishers using exclusively trap/handline harvesting technology. This community is unusual in Newfoundland for having protected fishing area legislation since 1895 with strict gear restrictions. The appropriators believe gear restrictions limit the potential for overexploitation and permit full participation of harvesters. When the regional government removed these protections from law in 1961 without consultation, the harvesters lobbied, and won, their reinstatement.

During the study period, no change had occurred in the property rights regime related to the appropriation resource. At the end of this period the owners were exercising, or attempting to exercise, de jure and effective closed access to this resource.

- **Social Infrastructure:**

The primary soft infrastructure is the fishermen's knowledge of the migratory patterns of the resource and the best cod fishing locations under different climatic, hydrographic, and biological conditions, learned and passed down over generations. Much of this information is known to all considered part of the "in" group, but some information is only available to older and more experienced fishermen, or those who receive it from a close relative, usually from father to son. Additionally, wayfinding to these locations, especially in difficult conditions, is another form of soft infrastructure.

Additional soft infrastructure are the social customs and rituals that reinforce community cohesion and trust, many of which center on the church. Despite religious distinctions, the subgroup has a strong collective identity based on their resource appropriation tradition, that has provided the foundation for their advocacy to maintain control over resource management.

- **Human Infrastructure:**

The harbor and processing facilities (respectively, hard public and hard private infrastructure) are located in the town of Petty Harbour. As of 1971, the boats and fishing gear employed in the fishery were appropriator-owned and basically unchanged since the beginning of the fishery,

1.4 Rules in Use (IAD)

The general framework of the rules-in-use has governed the activities of this subgroup for 26 to 50 years. A local appropriator committee with legislative authority, determines the gear limitations and designates fishing locations. Members of this subgroup have de jure rights of access, withdrawal and management of the resource. Exclusion from use of the entire resource is exercised de facto.

Records of the withdrawals from this resource are kept in a systematic way by officials. The appropriators can be seen by each other while withdrawing and delivering units. Retired appropriators serve as arbitrators over disputes, which most often occur over harvesting locations.

1. Boundary Rules:

- Appropriators must be Canadian citizens who reside in Petty Harbor. This rule is enforced at the local and rules-in-use level(s).
- Appropriators must be male. This rule is enforced at the rules-in-use level(s).
- A rule exists requiring use of handlines or cod traps. This rule is enforced at the local and rules-in-use level(s).
- There is a rule restricting handlining and trapping to distinct sectors.
- A rule exists requiring registration on an eligibility list. This rule is enforced at the regional, local, and rules-in-use level(s).
- A rule exists requiring the obtaining of access right (fishing location) through a lottery. This rule is enforced at the regional, local, and rules-in-use level(s).

2. Authority Rules:

- There is a rule requiring withdrawal at specific locations or spots, based on periodic lottery started in 1921. The lottery consists of two rounds, with the most productive locations auctioned in the first round; in this way, all fishermen are assured at least one productive location. An elected body of fishermen operates the lottery. This rule is enforced at the regional, local, and rules-in-use level(s), and is part of the most restrictive, regularly adopted/used set of rules.
- Once a boat has begun fishing a spot, a rule states that no other boat can come near to fish. The distance between boats is understood to be the appropriate spacing for lines to not become entangled. This rule reduces interboat conflict and is enforced at the rules-in use level.

- There is a rule requiring withdrawal units of a certain minimum size, set annually/periodically by an external public official. This rule is enforced at the regional level(s), and is part of the most restrictive, regularly adopted/used set of rules.
- Retired appropriators have authority to settle disputes between appropriators.

3. Information Rules:

- There exists a rule requiring recording of the number of units withdrawn. This rule is enforced at the regional level(s).

4. Scope Rules:

- A regional rule exists defining the start and end of the harvest period

2 Part II. Dynamic Analysis - Robustness

During the first study, the primary change was an adjustment by an external authority in operational, collective, or constitutional rules. There were no new groups starting to withdraw units from the appropriation resource. The conclusion of the first study was that, considering the multiple subgroups using this resource, some with prior consumptive rights, and the natural limit to the biological renewal of this resource, the rules limiting harvesting technology and harvest period function to constrain appropriation. However, the rules applied only in a portion of the migrating resource's range, thus limiting their effectiveness.

While Petty Harbor harvesters resisted new human-made technological infrastructure to preserve the resource, the regional government advanced a policy of high impact harvesting technologies, including mobile catch and track systems with factory freezer trawler licenses that intercepted the migratory resource before it reached inshore fisheries. This pattern of overharvesting was exacerbated by poor coordination between different forms of soft human infrastructure. During the 1980s, the public infrastructure provider pursued a modernized management strategy that relied on government scientists to estimate yearly allocations of Total Allowable Catch (TAC) using computational models. Overly optimistic TAC assessments in 1986-1987 were not adjusted based on the actual harvesting experiences of inshore resource users, resulting in over-appropriation during two consecutive years that ultimately led to the collapse of the resource. In 1986, in recognition of the management mismatch, the association representing the inshore fishery led by Petty Harbor appropriators brought a challenge to the Supreme Court to close the offshore fishery, but collapse was already imminent. In 1992 a moratorium was put in place that has lasted at least thru 2007.

The moratorium on the Northern cod fishery left approximately 300 Petty Harbor residents unemployed, and the town's population has declined. These remaining residents have adapted, partly by diversifying income sources and partly by shifting harvesting effort to other resources, such as snow crab. The interruption in the cod fishery has further eroded the soft human infrastructure of the appropriator group.

In the 1980s, a Supreme Court ruling changed the unemployment insurance rules, which had been a deterrent for spouses to form appropriator teams. By the mid 1980s there were approximately 9 women fishing with their spouses.

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