

Port Mouton Bay Lobster Trap Survey 2010-11

Port Mouton Bay fishermen's local ecological knowledge and experience lead them to report that lobsters will avoid an area they sense to be fouled.

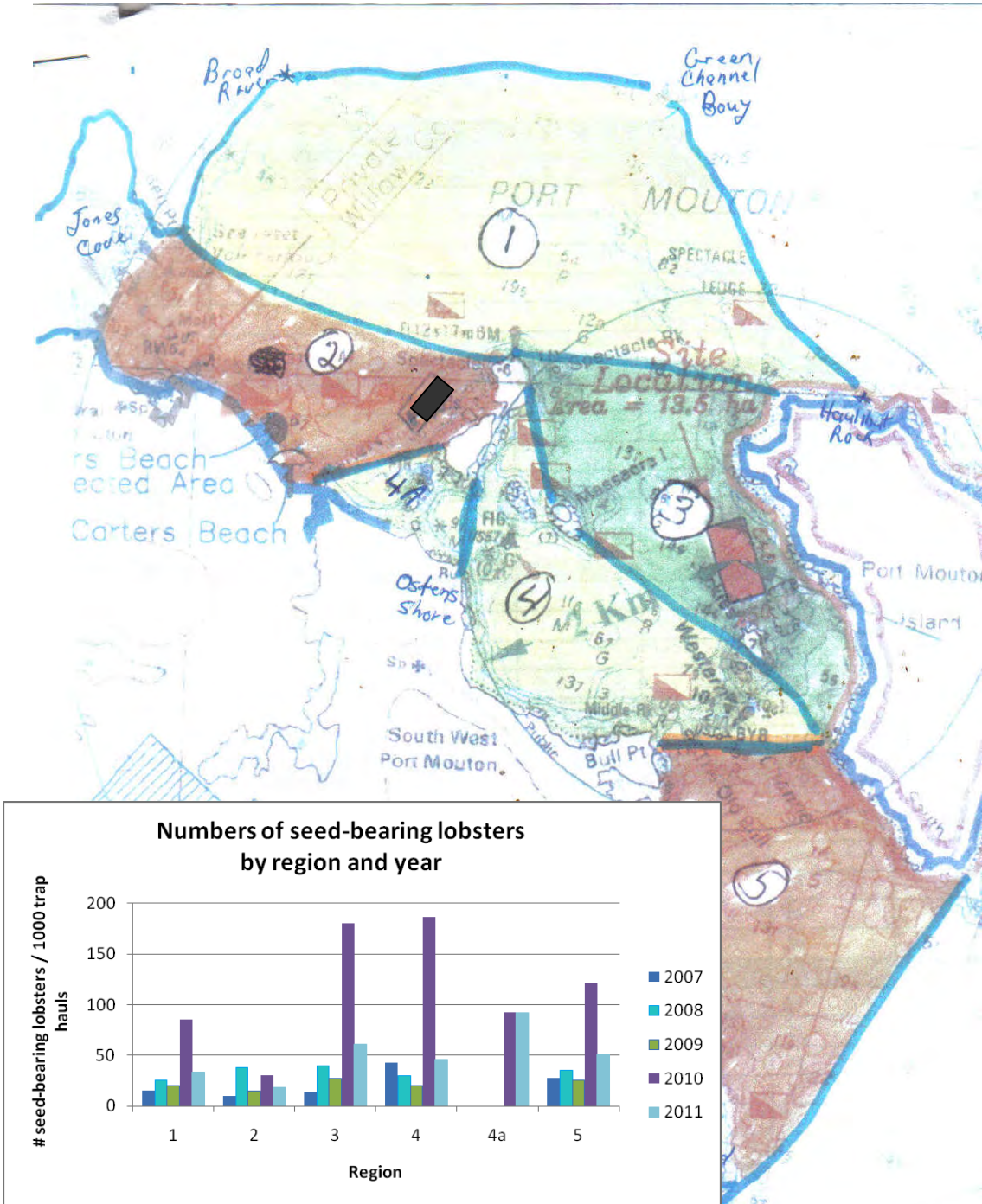
This knowledge was investigated by lobster trap surveys conducted between 2007 and 2011. After fallowing of the fish farm began in 2009, the 2010 survey showed lobster catches improved in all areas of the bay except Region 2 (the region of the fish farm). This pattern is most obvious with seed lobsters in both 2010 and 2011.

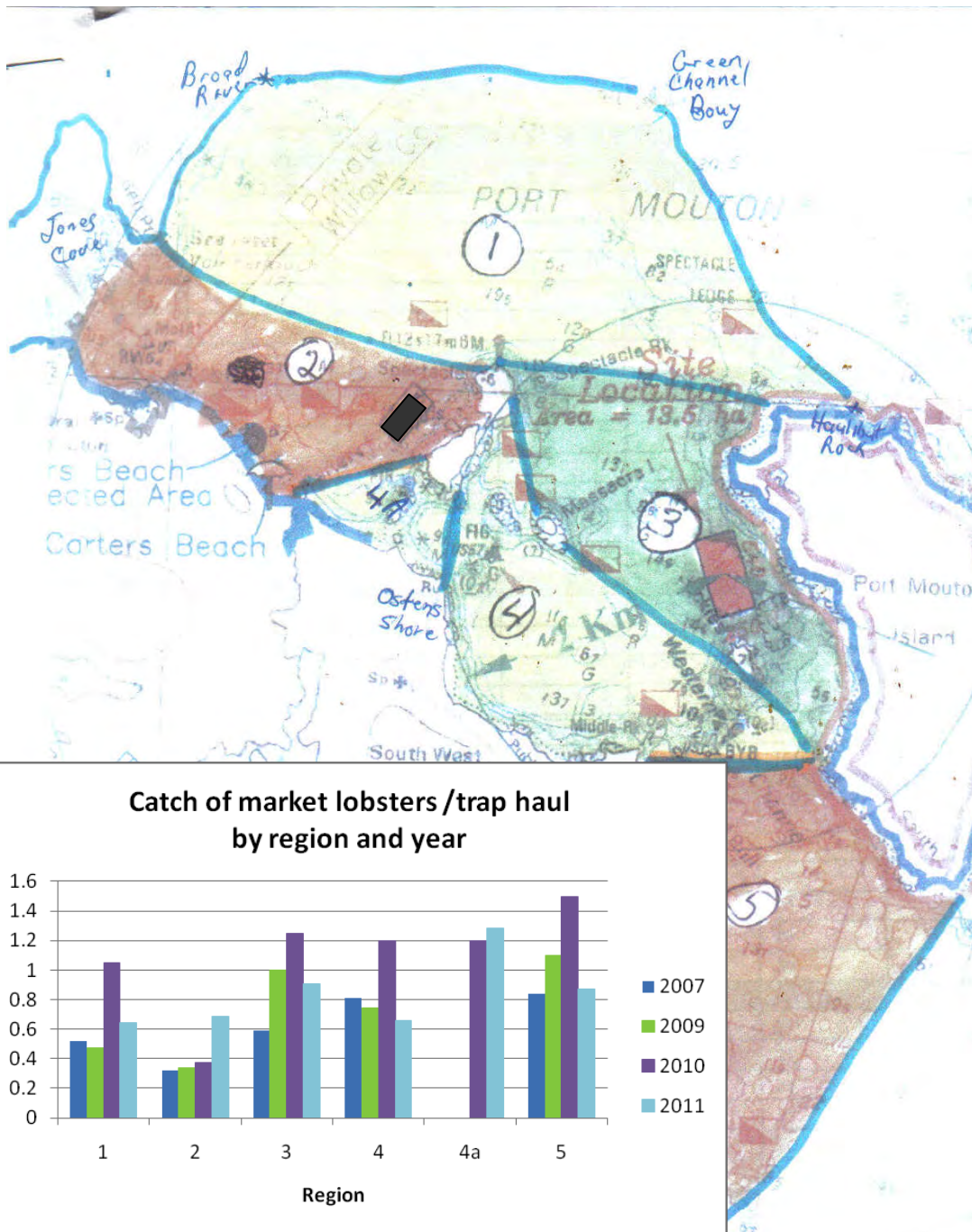
In 2011 there is evidence that the degraded lobster habitat zone is shrinking as more market lobsters were caught in the peripheral areas of Region 2. In all years to date (2007-11), lobsters were not caught in the immediate area of the fish farm.

In 2011, other ecosystem-based indicators – kelp, eel grass and Irish moss, mackerel, scallops and rock crab - are also exhibiting some recovery in the inner bay.

See Full Report below.

Port Mouton Bay Lobster Trap Survey – May 2007-11

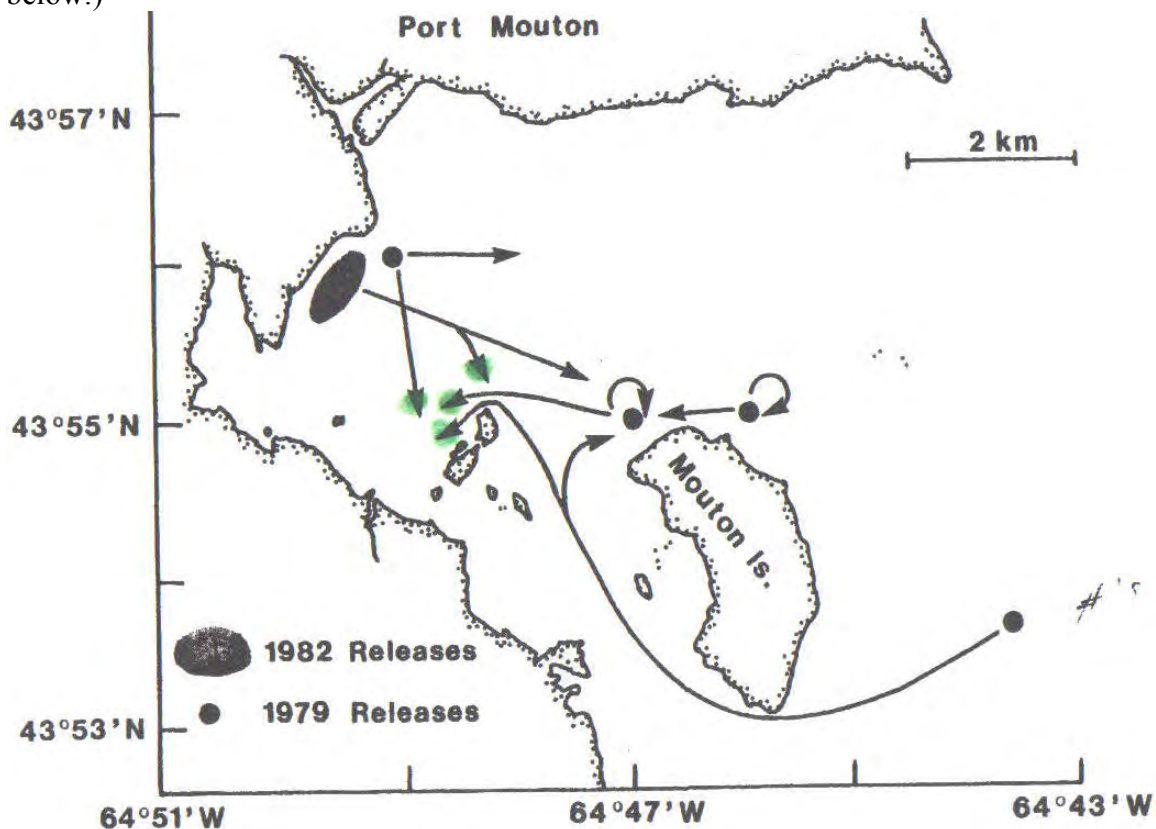




- In both 2010 and 2011 pounds per trap haul were greatest in Regions 3, 4a and 5. In all years, lobsters were caught in peripheral areas of Region 2, and not near the fish farm.

Fishermen of Port Mouton Bay were reporting that they had abandoned historical lobster fishing ‘territories’ within the bay because of very low catches. This trend had developed for 15 years during the presence of the fish farm in Region 2. These ‘territories’ had previously been prime lobster fishing ground and local knowledge also considered them to be a lobster spawning, moulting and nursery area.

Lobster surveys conducted by DFO have demonstrated that the inner harbour of Port Mouton Bay historically has been a destination for lobster migration. In 1946-7 (unpublished records in DFO files) and in 1979 and 1982 (Miller et al., 1989)¹ these surveys showed that a very significant portion of tagged lobsters released within and outside of Port Mouton Bay were recovered in Region 2 in the vicinity of the current fish farm site. Miller states that “most recoveries from both releases were within 2 km northwest to west-northwest of the northern end of Port Mouton Island”¹. (See figure¹ below.)



Release locations of tagged lobsters at Port Mouton. Arrows point toward the locations of most recoveries. Arrows pointing toward the release sites indicate no detectable movement.

¹ Miller, R.J., R.E. Duggan, D.G. Robinson, Z. Zheng. 1989. Growth and Movement of *Homarus Americanus* on the Outer Coast of Nova Scotia. Canadian Technical Report of Fisheries and Aquatic Sciences, No. 1716, Department of Fisheries and Oceans.

A lobster trap survey was initiated by Port Mouton Bay fishermen during the last two weeks of the lobster season in May of 2007 and repeated in the following years of 2008, 2009, 2010 and 2011 and is expected to continue. This survey involves recording all trap locations and yields for five contiguous areas in the bay and provides the abundance (in pounds of lobster), catch-per unit-effort (pounds of lobster per trap-haul) and numbers of seed lobsters (numbers per 1000 trap hauls) for each region. The 2008 survey reported numbers of seed lobster only.

Two weeks of survey data were based on 11,597 trap hauls by 12 fishermen in 2011, 13,313 trap hauls by 14 fishermen in 2010, 10,034 trap hauls by 15 fishermen in 2009, 5,063 trap hauls by 12 fishermen in 2008 and 6,069 trap hauls by 7 fishermen in 2007. Fishermen report their data for analysis on an individual and confidential basis. Poor weather conditions were a contributing factor to the lower number of trap hauls in 2011.

Bottom temperature data in Port Mouton Bay from a temperature recorder provided by the Fishermen and Scientist Research Society (FSRS) placed in a trap in Region 4(A) showed higher temperatures for the May 17-31 period in 2010 - (42-50° F) than in 2009 (39-43° F). The temperature recorder failed in 2011 but unofficial reports indicate lower temperature records for May.

During this series of late May surveys, 2007 to 2011, Region 2, in the Inner Bay, historically a prime lobster fishing ground, consistently shows significantly lower abundance of market lobsters and lower numbers of seed lobsters than other regions (with the exception of the adjacent Region 1 in 2011) regardless of bottom temperatures and weather conditions. Region 2 includes the existing salmon aquaculture farm site west of Spectacle Island which has been fallowed since late July 2009 (cessation of fish feeding July 20, 2009). Seed lobsters have increased in the fallowing period (2010-2011) in all regions except Region 2, compared to 2007, 2008, 2009 before fallowing of the fish farm.

In Region 2 fishermen reported lobsters caught in areas distant from the fish farm site, but traps set closer to the fish farm site in 2010 were removed due to negligible catches, black foul-smelling mud on traps and fouling of traps with nuisance algae. In 2011, fishermen reported lobsters caught in peripheral areas SW and NW from the fish farm site but traps were not set closer to the fish farm site due to continuing conditions of nuisance algae and foul-smelling black mud. (R. Broome, A. Bush, R. Lawson, M. Roy, D. Roy, pers.comm.)

Factors potentially contributing to absence of lobsters in the area of the fish farm are:

- Absence of prey (e.g. rock crab)
- Foul smell (lobsters have keen sense of smell)
- Nepheloid layer of easily disturbed fine waste sediment (which irritates gills of lobster)
- Nuisance algae (lobsters don't enter traps filled with algae)
- Barren sea floor (absence of refuge in eel grass or kelp)

Fishermen reported in personal communications in 2010 that the degraded lobster habitat zone appears to be shrinking, as evidenced by the fact that for the first year in many years lobster fishing took place within Port Mouton Bay for the entire season. In 2011, fishermen report that conditions continued to improve around the boundaries of the degraded zone but that Region 2 has not returned to its original productive state.

The higher numbers of seed lobsters in 2010 and 2011 in regions except Region 2 support the local ecological knowledge of fishermen that Port Mouton Bay is a lobster spawning, and nursery area to which seed lobsters migrate to moult and discharge eggs.

Other Ecosystem-based Indicators

Kelp

In spring 2010 fishermen report flourishing beds of kelp which were previously smothered with sediment in Area 4A. (R. Broome, B. Fisher, pers. comm.). Kelp forms important refuge habitat for lobster

Irish Moss Harvest

Irish moss harvesters report flourishing beds of Irish moss during the first week of July 2010 in areas some 400 to 500 m distant from the fish farm site (near Spectacle Light and in Region 4A). This has not been the case in many years. The Irish moss contained juvenile lobster, scallop and crabs – indicating a nursery habitat (T. Leslie, E. Fisher).

Eelgrass

Eelgrass first became visible in Spectacle Harbour approximately 500 m from the farm site in the summer of 2010 after one year of fallow. In June of 2011, eelgrass at the same location was approximately one-third as high as healthy beds of eel grass at Jackie's Island - near Port Mouton Island (C. Fisher). Eelgrass beds were measured in Port Mouton Bay by divers in August 2011. Since eelgrass is associated with 50% of marine species, it is recently recognized as an Ecologically Significant Species (DFO, 2009), and is known as the 'coastal canary'.

Mackerel

Historically, mackerel have been abundant in Port Mouton Bay and are fished for food and bait. Mackerel avoided the bay during years of aquaculture but reappeared in 2010, are more abundant in 2011 and are now appearing in the inner bay (R. Swim), but not in the area of the fish farm (B. Fisher).

Scallops

The recreational scallop fishery in inner Port Mouton Bay disappeared during the active period of the salmon farm and is showing some recovery in summer 2011.

Crab

Rock crab are traditionally fished for lobster bait. A few rock crabs caught near the fish farm site in 2010 were discolored dark brown in spring 2020. No rock crabs were reported caught there during the lobster season of spring 2011. Rock crab were first sighted in Spectacle Harbour (400 m from fish farm site) in July 2011. Rock crabs were caught near Summerville beach in 2011 for the first time in many years (R. Swim)

Nuisance Algae

Nuisance ('slime') algae which spread within the entire bay during operation of the fish farm still persists in 2011 near the farm site at the south-western end of Spectacle Island (R. Broome, B. Fisher).

Conclusions

Five years of lobster trap surveys in Port Mouton Bay and 22 months of fallowing at the farm site indicate that the inner harbour (Region 2) of Port Mouton Bay, historically a prime lobster fishing ground, has not yet recovered from effects of salmon farm waste. The evidence in support is the fact that Region 2 shows significantly lower numbers of seed lobsters than other regions in the bay and lower abundance of market lobsters (except for the adjacent Region 1 in 2011) regardless of year-to-year variation in bottom temperatures and weather conditions.

Nevertheless there is evidence that the degraded zone in Region 2 continues to shrink during the fallowing period and lobsters are caught in the peripheral areas of Region 2. The lobster trap survey will be repeated in May 2012 to continue monitoring the rate of recovery of lobster habitat.

Other species – kelp, eel grass and Irish moss, mackerel, scallops and rock crab are also exhibiting some recovery in the inner bay.

Reference

DFO, 2009. Does eelgrass (*Zostera marina*) meet the criteria as an ecologically significant species? DFO Can. Sci. Advis. Sec. Sci. Rep. 2009/018.