

Job Report

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Project Name: Basic Ecological Survey of Area M-3.

Period Covered: September 1, 1958 - September 1, 1959. Job No. E-3

Hydrographic Studies Related to Rollover Pass and Possible Effects on the Fauna.

Objectives: Study of the hydrography and related fauna of Rollover Pass, Bolivar Roads, and San Luis Pass to determine effects of opening Rollover Pass.

Procedure: Stations will be set up at the three inlets and nearby. These stations are visited monthly to gain basic information on the hydrography of inlets and their effects on the fauna of the nearby bay areas.

Findings: Observations on the three inlets (Rollover Pass, San Luis Pass, and Bolivar Roads) left the impression that Bolivar Roads allowed passage for a greater number of organisms during fall migrations. This could be true since the inlet provides more room besides being easier to find. Also, it is adjacent to the greatest water area of the Galveston Bay System.

Rollover Pass is a short, narrow artificial inlet, connecting East Bay with the Gulf of Mexico. The area was studied by Reid (1957 and earlier papers) for parts of three summers. He discussed changes in the hydrography and fauna of East Bay apparently due to the introduction of higher salinity water through the inlet. Rollover Pass is interesting; as it is one of the few, if not only, inlets connecting the upper reaches of an estuary with the sea. As a result the inlet has a large flushing rate, and the bay has had nearly freshwaters replaced by relatively high salinities.

The past history and many other details about Rollover Pass were given by Reid in his several papers, so this will be limited to data gained from May through August 1, 1959. Rollover Pass was reopened on May 29, 1959 after bulkheads were constructed along both sides from the bay entrance to Rollover to the beach line at the Gulf side. Rip-rap was placed along the groins inside the pass on both sides for the whole length. Bulkheads across the Gulf mouth were driven to six feet below mean low tide. Bulkheads across the pass at the highway bridge were cut in a shallow V to the same depth. About one month after it was reopened, a bar well marked by breakers was formed in the Gulf just outside the inlets. A strong WSW alongshore current exists most of the year in this region. This current may originate from the Mississippi Delta; as Bates (1953) has shown a westward drift from that area and salinities along the beach from September, 1958 through July, 1959 ranged from 19 to 26 parts per thousand which is relatively low for inshore Gulf waters. Some of this water may also originate from Sabine Lake waters being carried westward.

Jon K. Shidler and C.W. Washburn conducted much of the field work during June.

On July 1, the first invader, Callinectes danae Smith, was taken in Rollover Bay. A few strands of Sargassum were taken in the upper bay.

Specimens collected in regular trawl collections from East Bay along with isohaline maps were deposited in the Seabrook Laboratory for later comparisons.

General Considerations

Other than providing an excellent location for the capture of migrating fishes Rollover Pass seems to have little value to the fisheries of East Bay. It does cause a faunal change, but whether this is to the advantage or disadvantage of the fishery or is inconsequential will require study for several years to determine long term effects. From the present state of knowledge, the answer could probably be found by comparing productivities of high and low salinity areas, since this is the main effect.

Possibility of Rollover Pass Remaining as a Tidal Inlet

Rollover Pass is one of the few, if not only, inlets that opens into the upper end of an estuary. This is an unnatural situation for inlets on the Texas Coast, and results in excessive tidal flushing. Also, all inlets on the Texas Coast except Pass Cavallo and possibly San Luis Pass must migrate. Even the main channels of these two migrate. Of course, the jettied inlets are maintained by the Corps. of Engineers to keep them from migrating as they did before being jettied. Since Rollover has no place to migrate, it should need the extensive maintainance that other jetties require. But since the groins at Rollover do not extend beyond the beach, the inlet may tend to migrate around the groin, and extensive beach erosion occur.

Within a few weeks after Rollover Pass was opened a cusped bar built across the Gulf mouth. This is part of the tidal delta that builds across both mouths of inlets. Hurricane Debra removed the bar but it will continually build until sufficient water currents remove it. This bar may also cause the channel to shoal.

In view of the precarious position of Rollover Pass being located essentially in the middle of town, and that Rollover Pass has a tendency to migrate, it is concluded that Rollover Pass is unstable and has little chance of success as a tidal inlet. Another factor, as yet unexplored, is the effect of rapid sedimentation from fresh turbid waters from the East Bay drainage system meeting salty Gulf waters.

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Date Approved:

30 Sept. 1959