

TRIP B-1

JACKSON ESTUARINE LABORATORY; SEDIMENTATION IN
GREAT BAY ESTUARINE SYSTEM; SOLID WASTE DISPOSAL
IN GULF OF MAINE

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I. Jackson Estuarine Laboratory

A major marine science facility of the University of New Hampshire, the Jackson Estuarine Laboratory was constructed in 1969-1970 with grants from the National Science Foundation, the New England Regional Commission and with University appropriations. The location of the laboratory at Adam's Point affords easy access to the Great Bay estuarine system and to the Atlantic continental shelf.

Within 9000 square feet of space the Jackson Laboratory provides several individual research modules, an administrative wing and a variety of specialized facilities which include seawater trays, constant temperature rooms and a dark room. The University's 45 foot research vessel, R/V Jere Chase, moored at the laboratory, is also available to the marine scientists.

Faculty members and their students from the Departments of Biochemistry, Botany, Microbiology, Earth Sciences and Zoology are brought together in the Jackson Estuarine Laboratory where they often combine studies in biological, physical and geological oceanography. Many of the projects requiring instrument or structure design are carried out with the cooperation of the Ocean Engineering Group from the College of Technology.

II. Sedimentation in the Great Bay Estuarine SystemPresent Deposition:

Sedimentological studies of the Great Bay estuarine system have shown that coarse grained sands and gravels floor the channels of the main estuary, while silts and clayey silts comprise the bulk of the sediments found in the shallow tidal flat areas.

Most of the coarse grained sediments were cut off from the estuary early in the 19th century when numerous mills and dams were built on each river emptying into the bay (Exeter-

Squamscott River, Newmarket-Lamprey River, Durham-Oyster River, Dover-Bellamy, and Cocheco Rivers, Berwick-Salmon Falls River).

Because the finer grained suspended sediments are still being transported into the estuary especially during spring thaws and late fall rains, the Department of Earth Sciences at the University of New Hampshire has concentrated its sedimentological studies on the suspended matter in the estuarine waters. At the present time we have been examining the factors that change the daily and seasonal concentrations of suspended sediment. Data are being collected on the effect of resuspension by bottom currents, resuspension by wind waves, local productivity, effects of ice, discharge, etc. In addition, proposed wave tank modeling should help isolate individual factors for more quantitative results.

Past Deposition:

In the recent geologic past the Great Bay estuarine system has been strongly modified by glacial conditions. Cores which we will attempt to obtain off of Thomas Point have shown the present channel is cutting into a probable "lake" deposit of varved sediments. At the present time the stratigraphy of the varved deposit and the overlying sediments is being reassembled by detailed coring up the channel walls.

III. Physical and Biological Implications of Solid Waste Disposal in the Continental Shelf Basins of the Gulf of Maine

"Solid wastes, the by-products and discards of our society, amounts to approximately 5.5 lbs. per capita per day collected by municipal and private agencies." This statement by the Council on Environmental Quality (October, 1970) translated into terms which relate to the Boston metropolitan area means an output of solid waste of about 6 million tons per year. Until recently solid waste was readily disposed of in nearby land-fill sites and in coastal areas or wet lands. Having been recognized as a serious detriment to our environment, the destruction of wet lands by this process has been curtailed; also land-fill tracts suitable for solid waste disposal have become exceedingly difficult to find. Although only a relatively small amount of solid waste is currently being disposed of in the oceans, there are strong indications that greater and greater use will be made

of the deeper marine realm as a receptor of the waste products of our large, coastal, metropolitan centers.

Off the New England coast, 100 to 150 km. east of Boston, several basins appear to be areas which are likely to be proposed as receptacles of urban wastes. These basins with a perimeter of several hundred km. and with a depth of greater than 200 meters could receive Boston's waste for many years. The question we are trying to answer in this project is: What effect will disposal of waste into these basins have upon the marine environment? We are coordinating our study of Jeffery's Basin, with similar investigations of the Murray and Wilkinson Basins by oceanographers at Woods Hole Oceanographic Institution.

The objectives of the study are to gain knowledge of:

- a) the basin flushing rates in order to estimate the rate at which oxygen enriched water will flow through the basin.
- b) the sedimentation rate in order to estimate the burying time of the solid waste.
- c) the types of organisms presently occupying the basin and the effect upon them of changing the food source and substrate.
- d) the physical properties of baled solid waste, the way in which the waste bales will behave in the basin environment, along with the engineering methodology required to observe, sample and return the bales during testing.

IV. Procedure for Trip B-1

This excursion is offered on Saturday, October 2 and Sunday, October 3. Because of space limitations the total number of participants on each day is limited to 15 persons, the order of priority being established by the order of receipt of paid-up registrations for NEIGC '71.

After a brief tour through the laboratory, the trip will proceed on a cruise and brief coring operation on Great Bay. At this time we can discuss the two studies which are described in Sections II and III of the write-up.

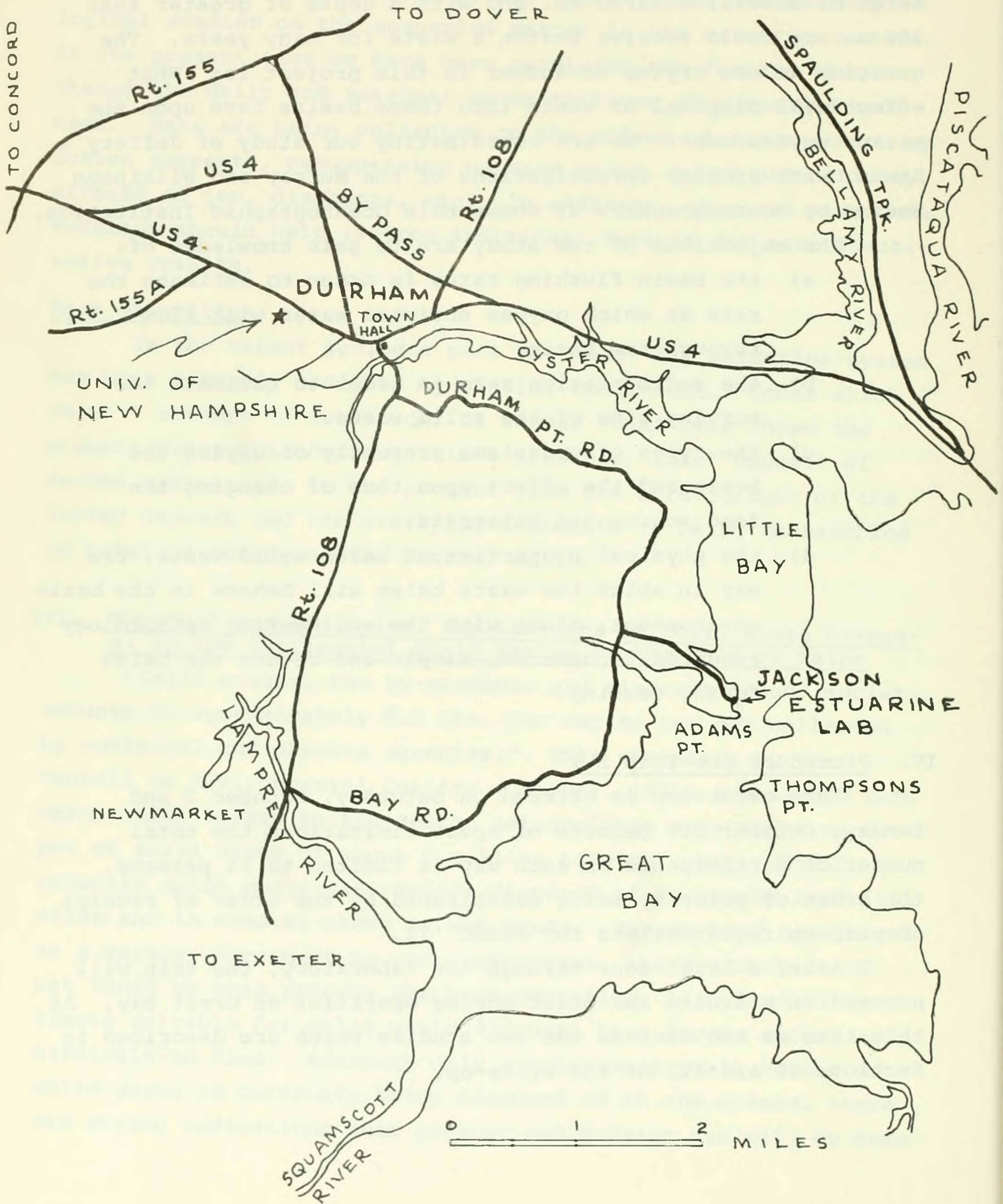


Figure 1

ROAD LOG FOR TRIP B-1

Proceed easterly from Concord on Route 4 for 34 miles to the center of Durham. Trip mileage begins here, aided by map showing location of Jackson Estuarine Laboratory.

Mileage

- 0.0 Starting at the Durham Town Hall (Junction of U.S. 4 and Rt. 108 in town) drive south on Rt. 108, 0.4 miles.
- 0.4 East (left) on Durham Point Road 3.6 miles (which curves and eventually heads south).
- 4.0 East (left) on Adam's Point Road 1.0 miles (sign here indicating Jackson Estuarine Laboratory). Drive carefully 0.8 miles: narrow, winding road. Drive VERY CAREFULLY last 0.2 miles: single lane, narrow winding road to lab.
- 5.0 Park in upper lot; if this is full, drive on a few feet to lower lot.