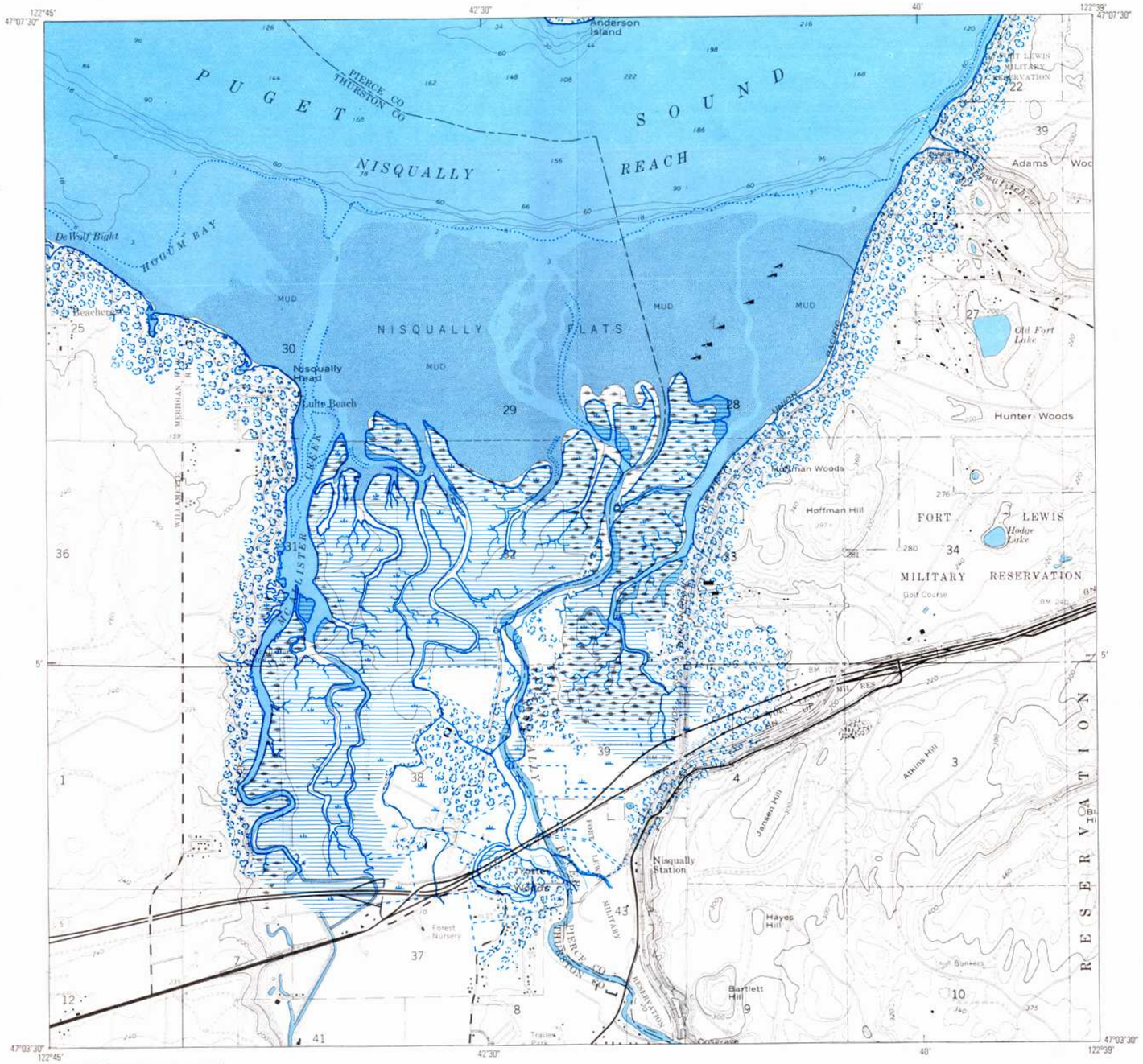
I 19.89:HA-617/no.9
c.3

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

Prepared in cooperation with the
U.S. DEPARTMENT OF JUSTICE AND THE BUREAU OF INDIAN AFFAIRS

HYDROLOGIC INVESTIGATIONS
ATLAS HA-617 (SHEET 9)



Base from U.S. Geological Survey, Nisqually, 1959.
Photorevisions as of 1968 and 1973

SCALE 1:24 000

1 ½ 0 1 MILE

1 .5 0 1 KILOMETER

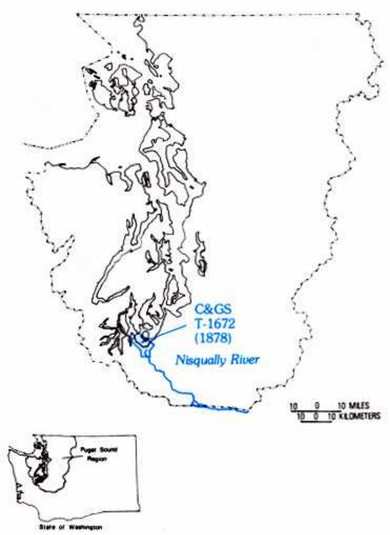
CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

EXPLANATION

Symbols for historical map	Features	Symbols for present-day map
	Shoreline	
	Mean lower low-water line	Seaward edge of intertidal wetland
	Boundaries for agricultural plots	Not shown
	Dikes or levees	
	Subaerial wetland (salt-water or fresh-water marsh)	
Area between shoreline and lower low-water line	Intertidal wetland	
	Forested upland	Not shown
	Grassland	Not shown

RECEIVED
AUG 1 5 2000
WASHINGTON STATE LIBRARY
DOCUMENTS

Summary of Environmental Changes and Some Planning Considerations	
Progradation (seaward advance of shoreline)	Minor progradation has occurred near the river mouth; probably less than 0.1 sq km of land added.
Recession (landward retreat of shoreline)	Minor; less than the amount of progradation.
Channel migration	Substantial. The shoreline of the Nisqually River has shifted laterally along most of its course shown here. The largest lateral migration of the river is approximately 200 m near the crossing of Interstate 5.
Channel straightening	The channel has straightened considerably in the vicinity of the Interstate 5 fill. The causes of the channel straightening, whether man related or natural, are not known to authors.
Diking or substantial filling of subaerial delta land near salt-water shoreline	Dikes have been built near the seashore of the western half of the delta.
Diking or substantial filling near stream banks	Dikes have been built along the western shore of the Nisqually River.
Other artificial landfill on subaerial delta land	Fill for US 99 and Interstate 5 in southern part of mapped area.
Landfill on intertidal delta land	Breakwater on eastern part of intertidal delta.
Loss of subaerial wetland	About 5.7 sq km of wetland was mapped in 1878 (table 2). The western section of the delta is no longer used for agricultural purposes, and the diked lands contained about 1.6 sq km of fresh-water marsh and wet meadow prior to the December 1975 dike break (Klotz and others, 1978, p. 119). The area of the present-day wetland is about 4.1 sq km with about 2.5 sq km in salt-water marsh.
Loss of intertidal wetland	The present-day intertidal area is about 1.6 sq km less than mapped in 1878.
Some planning considerations	The delta is in a relatively natural state, although the blocking of sloughs by dikes has somewhat reduced habitat available for fish and wildlife. As one of the least developed major deltas in the Puget Sound region, the remaining wetland and unmodified shoreline, if managed properly, can retain very high value as fish and wildlife habitat.



SOURCE MAPS FOR COMPILATION OF HISTORICAL SHORELINE AND LOCATION OF RIVER-MOUTH DELTA

NISQUALLY RIVER AND NISQUALLY REACH

Setting

The Nisqually River originates in glaciers on the slopes of Mount Rainier and flows northwesterly into southern Puget Sound at Nisqually Reach. The river follows a slightly meandering course across the delta and flows to a relatively large intertidal flat between bluff-bordered uplands. The intertidal area terminates at a steep delta front along the deep waters of Nisqually Reach. The wetlands of the delta are mostly undeveloped and lie within the Nisqually National Wildlife Refuge boundaries. At present, only a small part of the delta is used for agriculture.

Shoreline and Wetland Changes

In 1878 the Nisqually delta supported few agricultural plots, and was largely unmodified by man's activities. At that time, the subaerial part of the delta was mostly marsh but included some drier areas near the Nisqually River that were covered by forest or grassland. Many sloughs and embayments crossed the delta plain.

The primary disturbances to the original delta have been diking and conversions of salt-water marsh to fresh-water marsh or to agricultural land. The first dike was built in 1904 around a large area west of the river to develop the land for agricultural use (Klotz and others, 1978, p. 1). Farming operations continued within the diked area until the mid 1960's. Much of that area was inundated by salt water when a break in the dike occurred in December 1975. The dike was repaired in June 1977, but the period of salt-water inundation had been nearly two years and the plant community in that area was greatly altered. Prior to the dike break, wet meadow and fresh-water marsh covered about 1.6 sq km or 0.6 sq mi (Klotz and others, 1978, p. 1 and 119). East of the Nisqually River, and also in the western part near McAllister Creek, the delta is undiked and remains as salt-water marsh.

Compilation of Map

The 1878 topographic survey (T-1672) was the main source of historical data for the Nisqually delta compilation. Because no cultural features were common to the historical and present-day maps, the matching of the old and modern maps was accomplished using agreement of topographic features, namely the east and west hills bordering the lowland. Many lateral adjustments, in the range of 0.5 to 2 mm (.02–.08 in) at the 1:24,000 scale, were needed to correct for discrepancies believed to represent inaccuracy in the earlier survey.

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA.—1980—L79387

HISTORICAL CHANGES OF SHORELINE AND WETLAND AT NISQUALLY RIVER AND NISQUALLY REACH, WASHINGTON

By
G. C. Bortleson, M. J. Chrzastowski, and A. K. Helgerson

1980