

Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, Including Economic Analysis

INTRODUCTION

The Alaska National Interest Lands Conservation Act (1980) established the Arctic National Wildlife Refuge (ANWR) (fig. 1). In section 1002 of that act, Congress deferred a decision regarding future management of the 1.5-million-acre coastal plain ("1002 area") in recognition of the area's potentially enormous oil and gas resources and its importance as wildlife habitat. A report on the resources (including petroleum) of the 1002 area was submitted in 1987 to Congress by the Department of the Interior (DOI). Since completion of that report, numerous wells have been drilled and oil fields discovered near ANWR (fig. 2), new geologic and geophysical data have become available, seismic processing and interpretation capabilities have improved, and the economics of North Slope oil development have changed significantly.

The U.S. Geological Survey (USGS) commonly is asked to provide the Federal Government with timely scientific information in support of decisions regarding land management, environmental quality, and economic and strategic policy. To do so, the USGS must anticipate issues most likely to be the focus of policymakers in the future. Anticipating the need for scientific information and considering the decade-old perspective of the petroleum resource estimates included in the 1987 Report to Congress, the USGS has reexamined the geology of the ANWR 1002 area and has prepared a new petroleum resource assessment.

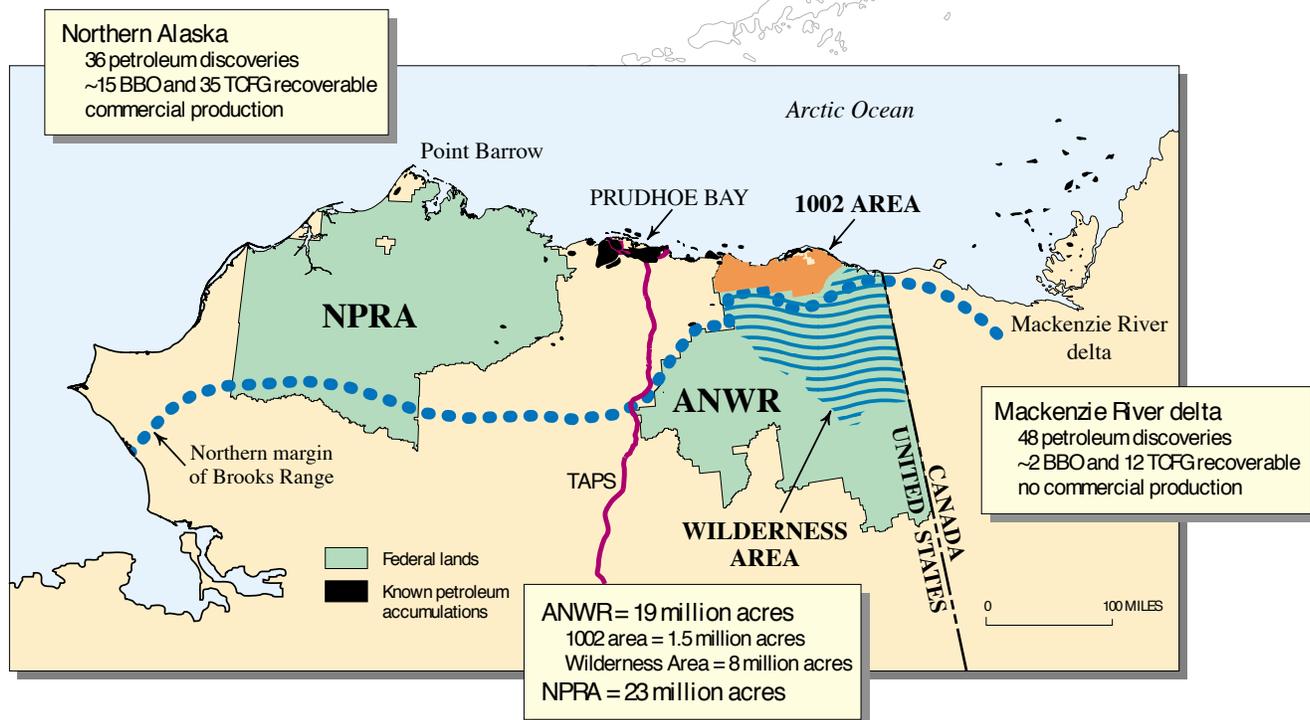


Figure 1. Map of northern Alaska and nearby parts of Canada showing locations of the Arctic National Wildlife Refuge (ANWR), the 1002 area, and the National Petroleum Reserve—Alaska (NPRA). Locations of known petroleum accumulations and the Trans-Alaska Pipeline System (TAPS) are shown, as well as summaries of known petroleum volumes in northern Alaska and the Mackenzie River delta of Canada. BBO, billion barrels of oil (includes cumulative production plus recoverable resources); TCFG, trillion cubic feet of gas recoverable resources.

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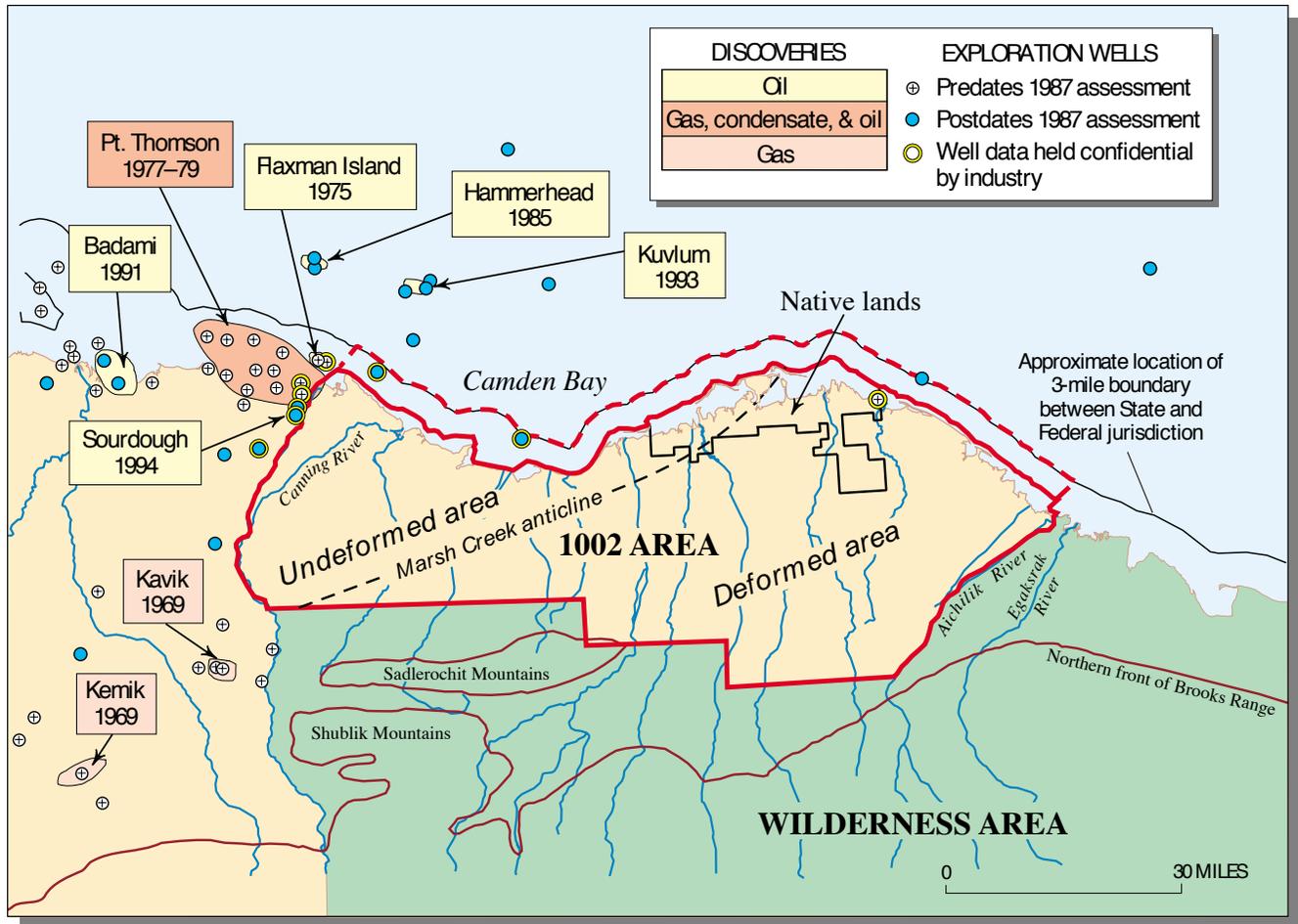


Figure 2. Map of the ANWR 1002 area. Dashed line labeled Marsh Creek anticline marks approximate boundary between undeformed area (where rocks are generally horizontal) and deformed area (where rocks are folded and faulted). Boundary is defined by Marsh Creek anticline along western half of dashed line and by other geologic elements along eastern half of dashed line. Exploration wells are coded to show whether information from them was available for the 1987 USGS assessment of in-place petroleum resources. Dashed red line shows the offshore extent of the entire assessment area.

ASSESSMENT PROJECT

The new assessment involved 3 years of study by 40 USGS scientists, who coordinated work with colleagues in other Federal agencies, Alaska State agencies, and several universities. New field studies were conducted, new well and sample data were analyzed, and new geophysical data were acquired. Perhaps most importantly, all 1,400 miles of seismic data that had been collected by a petroleum-industry consortium in 1984 and 1985 were reprocessed and reinterpreted. Collection of seismic data within ANWR requires an act of Congress, and these are the only seismic data ever collected within the 1002 area. All this information was integrated as basic input into the petroleum assessment. The term "petroleum" is used herein to include crude oil, natural gas, and natural gas liquids. Although all petroleum commodities were assessed, results reported in this Fact Sheet are for crude oil only because it determines the economic viability of resources on the North Slope. Results for the other commodities are reported in a CD-ROM (USGS Open-File Report 98-34).

ASSESSMENT METHODOLOGY

The methodology used in this assessment is slightly modified from that used in the 1987 assessment of this area when the USGS estimated in-place petroleum resources for the DOI Report to Congress; the methodology is also slightly modified from that used in the USGS assessment of the National Petroleum Reserve—Alaska (NPR) (1979–1980). Ten petroleum *plays* were defined as the initial step of the assessment (fig. 3). A play is a volume of rock that contains similar geological parameters (such as petroleum charge, reservoir, and trap) that determine petroleum potential. In keeping with the USGS responsibility for assessing the petroleum potential of all onshore and State water areas of the United States, the total play area considered was extended to the 3-mile boundary between State and Federal jurisdiction. Thus, in addition to the Federal lands of the ANWR 1002 area, this assessment includes resources associated with State waters and Native lands (fig. 2).