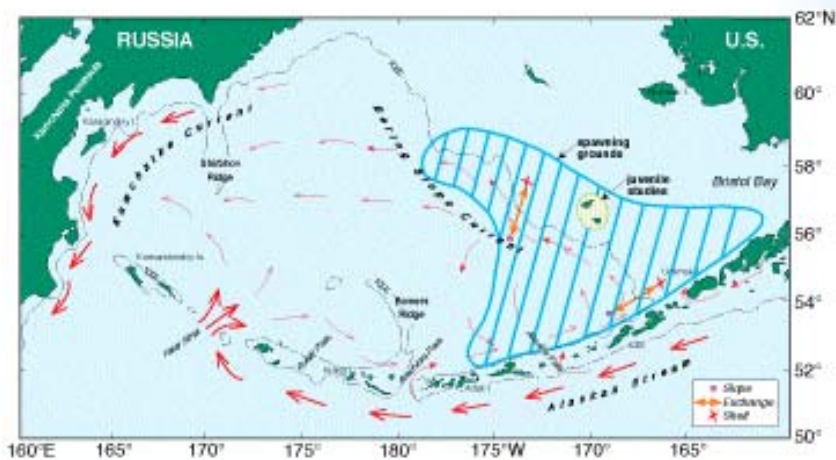


## Science Results from Program used to Protect Largest and Most Valuable U.S. Fishery

Approximately forty percent of the total U.S. commercial fishery landings by weight come from the Bering Sea. Walleye pollock is the most abundant fishery in this region, supporting a major domestic fishing industry worth well over \$1 billion per year. Landings of this key fishery, however, have declined significantly since the mid- 1980's with population levels fluctuating widely since the 1960's.

Prior to 1980, most of the pollock resources in the North Pacific were taken by foreign fleets fishing in the U.S. and Soviet Exclusive Economic Zone (EEZ). Implementation of the Magnuson Fishery Conservation and Management Act eventually forced all foreign efforts out of U.S. waters by the mid-1980s. Consequently these fleets were confined to a small area of international waters in the central Aleutian Basin, referred to as the "doughnut-hole". Unregulated harvesting continued in this area, leading to a fully exploited resource in danger of collapse.

Research showed two different coastal stocks making up the Bering Sea fishery but the mixing between the stocks was poorly understood. International boundaries and the complex nature of pollock aggregations in the region, create a difficult management problem, as allocating fish resources to the domestic fishery requires an understanding of population dynamics. Past studies also indicated that pollock larvae are a key component in the food web, and that the Bering Sea's deep basin may not be able to



*Spawning grounds for Bering Sea pollock as related to regional current patterns for use in transport pathways.*

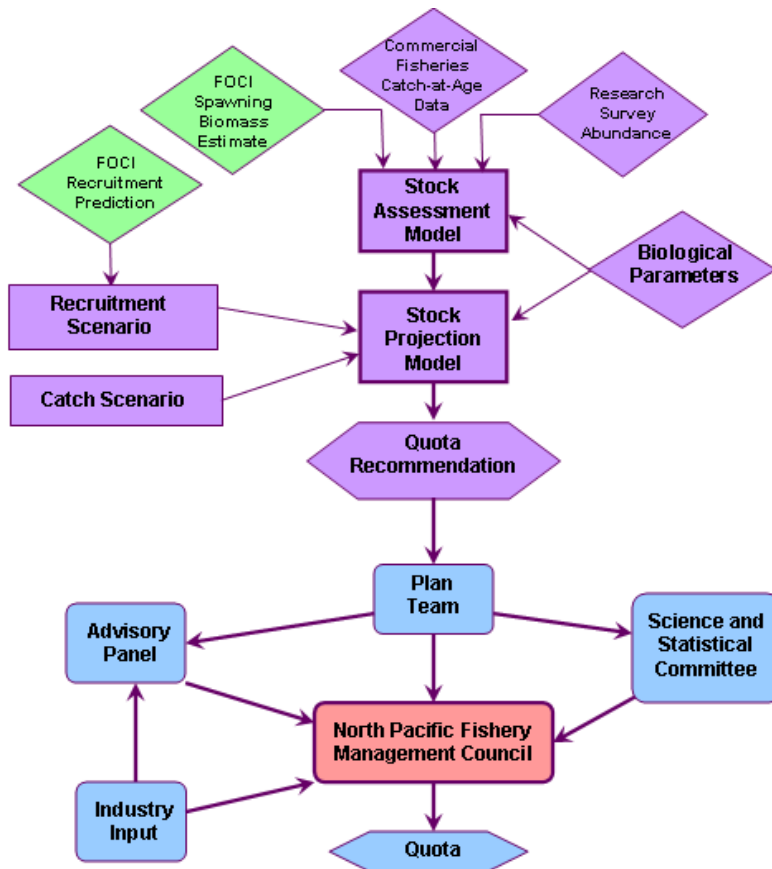
maintain the abundance of larval fish needed to sustain the fishery and top feeders such as marine mammals and seabirds.

### FOCI - Fisheries Oceanography Coordinated Investigations

Fisheries scientists and managers desperately needed information to determine the role of fishing pressure and changing environmental factors on Bering Sea resources, and their key ecosystem linkages. This need led to the creation of the Bering Sea Fisheries Oceanography Coordinated Investigations (FOCI) program, sponsored by NOAA's Coastal Oceans Program (COP). Ultimately, the project's aim was to provide fishery managers with improved knowledge and information to make critical fishery decisions affecting ecological population distribution and size.

The FOCI program's management structure consisted of six scientists, representing NOAA's PMEL (Pacific Marine Environmental Laboratory), and NMFS

(National Marine Fisheries Service), academic institutions and a Technical Advisory Group of academic and industry representatives. In 1991, COP co-sponsored an international workshop that assembled Bering Sea fishery data and developed a cooperative research plan involving cruises, field monitoring, sampling, and model development. A 1994 program review by the Ocean Studies Board of the National Research Council found the program was making significant progress toward achieving its objectives. FOCI research was providing critical information to resource agencies such as the International Convention on Conservation and Management of pollock Resources and the U.S. North Pacific Fishery Management Council.



*Schematic representation of information flow in the Gulf of Alaska Walleye Pollock Management process.*

## International Protection of Walleye Pollock

FOCI scientists have advanced our understanding of fish recruitment processes and have shown that the Bering Sea shelf provides a better environment for survival of larvae in areas where walleye pollock spawn. These and other study results demonstrated that the “donut hole” in the Bering Sea cannot support a self-sustaining population of walleye pollock, due mainly to low food availability. Only adult fish are found in the “donut hole” region, coming exclusively from U.S. waters, meaning international fleets were harvesting fish that were biologically part of U.S. stocks. This directly led to the international agreement that closed the “donut hole” fishery.

## Ongoing Research Support to Fishery Management

The Bering Sea FOCI program continues its legacy to this day, having spawned the Southeast Bering Sea Carrying Capacity Regional Ecosystem Study (SEBSCC), focusing research on juvenile walleye pollock and factors that affect their survival in the southeast Bering Sea shelf, a key spawning region. Results from the integrated suite of modeling, process studies, observations, and environmental valuation are currently providing routine and quantitative stock size and recruitment estimates to regulatory bodies like the North Pacific Fisheries Management Councils. Research investigating the relationship between the timing of the retreat of phytoplankton blooms could also have profound implications for year-class strength of pollock, and managing the pollock fishery in the Southeast Bering Sea.



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