School of Marine Sciences

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Good morning, Senator Reny, Representative Hepler and members of the Marine Resource Committee. My name is Damian Brady, I work at the University of Maine's Darling Marine Center in Walpole. I direct a state-certified lab for analyzing coastal water quality samples. Our lab analyzes samples for regulatory agencies, citizen groups like the Maine Coastal Observing Alliance, and businesses with discharges into the marine environment.

I am here on behalf of the University of Maine to provide informational testimony regarding LD 586, *An Act to Protect Maine Fisheries from the Effects of Industrial Aquaculture Operations*. The scientific and technical expertise I am sharing here has been informed by my own research and conversations with my UMaine colleagues including Aquaculture Research Institute Director Debbie Bouchard and Assistant Professor Matt Hawkyard. And in the interest of full transparency, the University of Maine does objective research and monitoring related to fish feeds and water quality connected to recirculating aquaculture system projects including for industrial clients.

Our laboratory works closely with the Maine Department of Environmental Protection (DEP) to ensure the highest data quality and develop monitoring programs that are protective of our coastal water quality because we also work with the lobster industry and shellfish and kelp aquaculture operators that rely on that water quality. Maine DEP has been protecting the health of our coastal waters since 1941 and during that time, they have developed successful monitoring programs for large dischargers such as wastewater treatment plants in southern Maine that service tens of thousands of people. Their rigorous monitoring and modeling keeps Maine waters in compliance with water quality standards and if standards are not met, they require additional treatment to quickly reduce water quality issues. We are happy to provide greater detail to this Committee outlining the monitoring programs we have jointly developed and what aspects of water quality we measure.

Marine-derived ingredients are in no way exclusive to recirculating aquaculture systems. Major industry uses include aquaculture feeds, pet feeds, terrestrial agricultural (i.e. chicken and pig) feeds as well as bait for commercial fisheries. All feed ingredients used in fish feeds, including those used in recirculating aquaculture systems, are currently regulated by the FDA and are either derived from domestic fisheries or are subject to international fisheries regulations and agreements.

Most commonly sourced marine ingredients come from "reduction fisheries," which are regulated at a number of levels and have become increasingly well managed. As evidence of this, the total global annual catch of wild fish for reduction fisheries has remained stable for over two decades and is expected to show minor decline in the future due to increasingly restrictive management policies. Future projections of global fishmeal production suggest that these ingredients will be increasingly obtained from fisheries processing waste (trimmings) and bycatch. Moreover, the total supply of fishmeal is anticipated to remain stable into the future, representing a bottleneck for the future expansion of the aquaculture industry. For this reason,

current research efforts are aimed at more efficient use of marine based ingredients whereby the use of these ingredients are used at the lowest levels without compromising fish growth, health and welfare.

The use of marine based ingredients in fish feeds, measured as fish-in fish-out ratios, are estimated to have declined from 4-6 pounds of wild fish per pound of cultured salmon in the 1990's to now approximately 1 pound of wild fish per pound of cultured salmon, a trend that is expected to continue to decline in the future. Across all cultured species globally the fish in fish out ratio is now less than 0.4 lbs of wild fish for each pound of cultured fish. Over a similar time period, the fed aquaculture industry has rapidly expanded and now provides approximately half of the global seafood production. These reductions have been enabled through research investments and industry cooperation. For example, modern fish feeds utilize an ever-increasing list of non-marine derived ingredients including soy beans, agricultural byproducts such as feather meal, as well as protein produced from insects grown on food waste.

The global human population now exceeds 8 billion people and is expected to reach 10 billion in the next few decades. The combination of population growth and increasing per capita seafood consumption has created the greatest seafood demand in the history of humanity. Globally speaking, capture fisheries production has not increased since the late 1980's and it is only the expansion of aquaculture that has met the growing demand for seafood. Aquaculture currently provides about half the seafood on Earth. However, most of this growth has occurred overseas, largely in China, and the US has become ever reliant on these overseas sources of seafood.

The US Department of Homeland Security has recently released a report stating that domestic seafood supply is one of the top threats to food security in the US. Our country has greatly fallen behind in seafood production and has an annual seafood trade deficit exceeding $16 billion. It is estimated that approximately 95% of seafood purchased by US consumers is imported. The underlying reason for this deficit is related to policies and regulations that have largely restricted the growth of domestic aquaculture. Domestic wild fisheries, while responsibly managed, are fully exploited and are not meeting the needs of the country.

In order to create a secure supply of seafood within the United States, it is imperative that we develop systems that support sustainable growth in aquaculture. Maine is poised to do this, to lead in an area that would greatly benefit the people of Maine and to play a major role in supporting the US national security in a time of environmental and geopolitical uncertainty.

I appreciate the opportunity to share my scientific and technical expertise with you today, and along with my colleagues, would welcome providing you any additional information or participating in the work session. Thank you for your ongoing support of the University of Maine, which makes my research possible.

I welcome your questions.