NPAFC Contribution

"Marine debris, plastics and microplastics"

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NPAFC contribution to Part I of the UN Secretary-General report on
"Oceans and law of the sea"

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Executive Summary:

Plastic debris is a well-known issue and a major concern for Pacific salmon scientists as an increasing pollution problem, affecting aquatic food webs worldwide. Dr. Katherine Myers presented a research paper "*Potential Mechanisms of Ocean Mortality of Juvenile Salmon and Steelhead Due to Ingestion of Plastic Marine Debris*" at the 3rd NPAFC International Workshop on April 25-26, 2013. In this paper, authors reviewed what is known about the ingestion of plastic debris by Pacific salmon and steelhead, presented field data collected in international waters of the North Pacific Ocean and Bering Sea, and discussed potential mechanisms of ocean mortality of juvenile salmon and steelhead caused by plastics ingestion.

As it was revealed, mechanisms of salmon marine mortality may be direct, e.g., lethal mechanical injury or toxicity, or delayed, e.g., reduction in reproductive health and fitness affected by heritable alterations in gene expression of progeny. Further field and laboratory process studies are needed as to the level of impacts to ecosystem and anadromous species in the North Pacific Ocean. Diverse chemicals (bisphenol A, polychlorinated biphenyls, polycyclic aromatic hydrocarbons, and derivatives of polystyrene) leached and absorbed by plastic debris can bioaccumulate in fish, and anadromous fish can transport these chemicals back to freshwater habitats. Processes of chemicals accumulation and turnover in Pacific salmon lake-river systems should be monitored and management measures adapted accordingly.

The marine debris problem is closely related to an issue of lost or abandoned fishing gear and potential "ghost fishing" that is an important problem for Pacific salmon conservation in the North Pacific Ocean. About fifty vessels conducting IUU high-seas driftnet fishing operations were sighted in the North Pacific Ocean in 1993-2015. There have been more than 10 cases, when illegal driftnet vessels have cut their nets loose in the water, and discarded it, just as the patrol vessel or surveillance aircraft approached.

In May 2014, US Coast Guard cutter *Morgenthau* inspected the IUU fishing vessel *Yin Yuan* that was sighted in the NPAFC Convention Area with driftnets, net tube, and net spreader on board. It was revealed that the master dumped this fishing gear overboard at night before the inspection. *Yin Yuan* was facing a number of offenses including use of prohibited fishing gear (3.3 km of high seas driftnet) and violations of the International Convention for the Prevention of Pollution from Ships (MARPOL). Custody of the fishing vessel *Yin Yuan* was transferred to the China

Coast Guard and the master was fined 100,000 RMB (currently approximately $16,300) for violations, the highest fine permitted under Chinese law under the circumstances.

Regarding marine debris, the U.S. Party presented information to the NPAFC regarding the NOAA's Marine Debris Program in 2008. The main objective of the Program was to use ocean circulation models, satellite remote sensing data, drifting buoys, and aircraft observations to locate lost nets and other hazardous debris in the open ocean before they enter shipping lanes, encounter coral reefs, or wash ashore and do further damage. As a part of this program, it was planned that during routine U.S. Coast Guard cutter patrol missions in the NPAFC Convention Area drifter buoys would be attached to derelict nets that could be tracked by satellite.