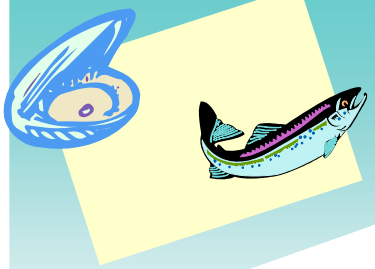

Maine Aquaculture

Aquaculture, the farming of animals or plants in the water is often referred to as the "Blue Revolution." While it is relatively new in the western world, aquatic farming has been practiced for over two thousand years in Asia. In the Hawaiian Islands for example, salt-water fish ponds were used to grow a fish called Moi for the royal chiefs and their families. As a country, the United States is behind countries such as Norway, Japan, and Ireland in developing an aquaculture sector. In 2003 we imported over 70% of the seafood we eat. Within the United States; however, Maine is a leader in both shellfish and finfish aquaculture. In fact, based on farm gate value, Maine is ranked the number one marine aquaculture producer in the nation. Oysters, clams, mussels, scallops, salmon, cod, halibut, and haddock are all grown right here in Maine. Maine water farmers make their living on and literally in the water every day. As pioneers on the blue frontier, Maine aquaculturalists rely on the high quality of Maine's cold, clean waters to produce healthy, high quality seafood. In fact, the health and growth of their farm animals is directly related to the health of the aquatic environments in which they are grown. Maine aquaculturalists are often the most vocal advocates for improved water quality and protection of the environment.

Benefits of Aquaculture

Like any business, aquaculture creates jobs in Maine's communities. In a state where many jobs are seasonal, most aquaculture jobs are year round because farms must always tend their animals. Boat builders, net makers, equipment manufacturers, packaging and seafood processing companies all benefit from Maine aquaculture. Trucking firms, animal health companies, local veterinary practices, environmental engineering firms and construction companies also regularly do business with Maine's water farmers. Aquaculture is a technical field. Many of the young people directly employed on the farms are graduates with advanced degrees from local, national and international universities. Maine's water farms are tourist attractions that showcase how Yankee ingenuity is pioneering new ways to sustainably use the oceans to grow healthy food.

Sea kayaking and wildlife viewing businesses often include aquaculture farms on their tours. Recretional fishing guides often stop by the farms with clients because fishing is good around the farm structures. One of the biggest benefits of Maine aquaculture is locally grown healthy seafood. Maine farms supply fresh trout, salmon, mussels and oysters to many local restaurants and hotels. In addition to economic factors, the Maine's water farmers help protect and rebuild wild fish and shellfish stocks. Fish and shellfish from Maine private hatcheries are regularly used to restock the wild. The health and safety of our products are dependant on Maine's clean waters The health and welfare of our animals our workers and our profitability are all directly dependant on healthy ecosystems and a clean environment. These linkages mean that Maine's water farmers are often the strongest advocates for environmental defense. As populations increase and land-based farm space becomes more limited, Maine aquaculture provides a safe and healthy food source for future generations.

Salmon Farming

The journey of farmed Maine Salmon starts in the cold, blue waters of Maine's coastal bays. Here carefully selected parent fish are held under ideal conditions and fed an all-natural diet with extra vitamins and minerals added. In the fall these Broodstock are ready to spawn and their eggs are transported to hatcheries up in the mountains of Maine where cool, clear freshwater is abundant.

At the hatchery the eggs are carefully incubated and hatched. Over the next 10-18 months the salmon fry are cared for by special hatchery teams that take great pride in their small fish. As these juvenile fish grow, they begin to get ready for the long migration to the sea. This process, called smoltificaton is one of the physiological wonders of the world. Slowly but surely the fish switch from being able to live in freshwater to needing saltwater. Just as our children get a series of vaccinations as they grow, the small salmon are also vaccinated as they grow and transform into smolts. These vaccines protect the salmon against diseases that they may encounter as they go out into the ocean. In the early spring the hatchery teams watch the smolts behavior closely in order to judge when the small salmon are ready for transfer to the marine farms.

When the time is right, the fish are loaded into special tank trucks and shipped down to Maine's rocky coastline. Here the fish are loaded on local boats and sped offshore to the marine farms. This is one of the busiest times of year for the farmers. Trucks role from dawn to dusk and everyone pitches in to get the smolts transferred before the water at the hatcheries gets too warm.

On the marine farms a new husbandry team takes over. Part fisherman, biologist, aquanaut and farmer these modern day ocean cowboys are a new breed of farmer. After the salmon are transferred into the ocean net pens, the new team dives to check that the small fish have adapted well to their new ocean surroundings. As cowboys ride their fences to check for breaks, salmon farmers swim their net pens regularly to check for holes or net wear. Over the next 15-26 months, these small salmon will grow to become powerful, silvery adults. High oxygen, cool temperatures, and strong currents make the waters off the Maine coast ideal for salmon farming.

By the end of this first summer the salmon will have grown to five times the size that they entered the ocean farms at. As autumn comes to New England, water temperatures begin to fall and the salmon's growth slows. Down east Maine is one of the toughest places in the world to be a salmon farmer. Strong storms lash in from the North Atlantic and brutally low air temperatures cause sea spray to freeze solid on anything it touches. Through all this, the salmon swim steadily below the storms in the swift currents of the down east waters.

As spring comes, the waters off the Maine coast begin to warm up. From dawn to dusk the farmers work to keep up with the salmons voracious appetites. Summer brings many other duties as well. Nets must be cleaned and repaired, boats hauled and painted, anchors and cages checked and repaired after the winter storms. As the water temperatures rise the farmers check the weight of the fish to see how much they have grown through the winter. Some salmon naturally grow faster than others and these fish are sorted out for the first harvests. Smaller fish that haven't grown as fast are put back into the ocean pens for the fall and winter harvest season. Once the fish are harvested from the ocean pens they are sent to special processing plants back on shore. Here hundreds of workers dress and pack the fish into many types of products for shipment all over the United States. As the cycle of seasons continues, fresh Atlantic Salmon from Maine's clear coastal waters is served daily on America's tables.

Shellfish Farming

Maine shellfish farmers grow many types of shellfish. Some like mussels and ocean scallops start their journey to market as small seed collected from the wild. These juveniles are then carefully grown up to market size on floating rafts and on bottom leases that are tended by the farmers. Other species like oysters, clams and bay scallops start their journey in a hatchery the same way salmon do. Every fall the healthiest, biggest and best condition shellfish are selected as brood stock for the next generation. These parents are brought into the hatcheries and fed specially cultivated microscopic algae to ensure they are getting all the nutrients and minerals necessary for healthy eggs. Light levels and water temperature are carefully monitored to ensure the maturing parents have ideal environmental conditions. As the winter progresses and spawning gets closer the farmer begins to grow other microscopic algae to feed to the juvenile shellfish once the eggs hatch. When spawning begins the farmer works around the clock to carefully collect the microscopic eggs released into the water by the parents. While the north Atlantic winter storms rage outside, the hatchery workers carefully shepard the tiny shellfish through a complicated series of physiological changes. Shellfish start as microscopic larvae that live suspended in the water column with other plankton. Through a series of dramatic physical changes they metamorphose into bottom dwelling juveniles only a millimeter in diameter. Part scientist, part farmer, part detective and part plumber the hatchery specialists must often invent new farming methods to solve the challenges of growing these delicate animals. As the juveniles grow the farmers must feed them algae more often and constantly clean the nursery. Throughout the early spring the farmer sorts the seed by size to ensure that all get enough to eat.

As the weather moderates and water temperatures in the ocean begin to climb the seed is transferred to special ocean nursery sites. These sheltered sites are carefully selected to help the juvenile shellfish make the transition from the hatchery to the ocean. This is a worrying time for the farmer as many things can go wrong and much has been invested in the small shellfish. Slowly but surely the juveniles adjust to their new surroundings and begin to feed on the natural plankton that grows in their new home. As water temperatures rise through the summer the juveniles grow fast and the farmer spends many hours tending the seed and making sure their containers are clean and free of predators or pests. At the end of the first summer in the ocean the various types of shellfish are handled differently. Mussels remain under their floating rafts hanging on specially designed ropes. As the fall begins some of these mussels will be harvested and sent to market. Others are held over for harvest in the coming year. In contrast, oysters, clams and some scallops are transferred from their nursery sites to over wintering or market grow out sites. Here the shellfish will hunker down and weather the coming winter storms. Throughout the fall as water temperatures drop, the farmers work long hard days to prepare for the coming winter. After planting the shellfish seed on the new sites farmers dive to check on their condition. Care must be taken to ensure that planting happens at just the right time. Too early and the seed may be susceptible to predators or disease, to late and they may not have a chance to settle into their new sites before the winter storms begin to rage. Next year if the farmer is lucky and conditions have been right harvesting will begin and the cycle will start all over again.

Healthy Benefits of Eating Maine Grown Seafood

Farmed salmon is naturally low in saturated fat and calories, so it fits in with any menu choice, whether it's for a normal or a fat restricted diet. As the chart shows, farmed salmon has about a third of the saturated fat of lean ground beef and 50 percent less saturated fat than chicken. One serving of farmed Atlantic salmon contains only 183 calories. This compares very favorably with other protein sources such as beef, 215 calories or chicken, 211 calories. Combine low saturated fat with good taste and low calories and you have a great healthy food for all ages. But it gets better! Salmon provides as much high quality, complete protein per mouthful as chicken, ground beef, pork or tuna. Add in the fact that Maine farmed salmon has some of the highest levels of omega-3 fatty acids (2grams per 100gram salmon portion) in any food you can eat and you have a heart healthy, low fat, body building food you can enjoy whether you are on a body-building regimen or a diet designed to slim down.

Farmed mussels and oysters are naturally very low in saturated fat (oysters .8, mussels .4 grams /100grams of shellfish meat). Although they are low in calories (oysters 68, mussels 86 calories/100grams of shellfish meat) mussels and oysters have relatively high levels of Omega-3 fatty acids. In fact out of all the common shellfish, mussels and oysters are the two best sources of omega 3s (mussels .8 grams, oysters .6 grams per 100 grams of shellfish meat). Combine those omega 3 levels with the fact that mussels and oysters are great sources of calcium, iron, potassium and phosphorous and you have a delicious source of many essential nutrients that can be prepared in hundreds of different ways.

MAINE SALMON, MUSSELS AND OYSTERS ARE LOW IN SATURATED FAT AND CALORIES

HIGH IN OMEGA-3

The Maine Aquaculture Association and its member growers are widely recognized as pioneers in the development of innovative and sustainable farming methods designed to enhance their stewardship of Maine's marine environments. Through a 14-point set of environmental guiding principles, cooperative bay management and a comprehensive code of practice, Maine's aquatic farmers are leading the way in a new, environmentally sustainable way to produce seafood.

Aquaculture Information Sources:

Maine Aquaculture Association

www.maineaquaculture.com

Maine Aquaculture Innovation Center

www.maineaquaculture.org

AquaNic Aquaculture Network Information Center

www.aquanic.org

World Aquaculture Society

www.was.org

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