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HONORING THE LIFE AND SPIRIT OF THE PACIFIC SALMON (1): Legal Systems to Protect Salmon in the United States and Japan

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Introduction

In the United States, people started advocating the importance of ecosystem management in the 1970s. A nationwide dispute, the Northern Spotted Owl controversy, was one of the roots of the ecosystem management idea.[1] Through the controversy, people recognized the need to protect ecosystems rather than just individual species. Since then the idea and techniques of ecosystem management have been introduced into actual administrative activities related to national resources such as national forests, national parks, wildlife refuges, and public grazing land.

It was not long after the Northern Spotted Owl controversy that the idea of watershed management was introduced. In general, the term "watershed" is used to describe hydrologic basins, either encompassing a small river basin or, more commonly, a small tributary to a much larger river basin.[2] The salmon controversy is one of the representative cases which let people think deeply about the importance of watershed management. As the rivers were developed and the water was used for multiple purposes since the early 1900s in the whole country, salmon have dramatically decreased and some of them have been designated as endangered species. Since then, the federal government, states governments, courts, fishery organizations, Indian tribes, environmental organizations, biological experts, and the general citizens have been groping for the best way to protect natural watersheds for salmon. Consequently, people recognize that healthy watersheds are vital not only for wildlife such as salmon but also for human beings because they are the base of agricultural, industrial, aesthetic, and environmental well being for human life. The United States government is trying to apply the watershed management idea to various places in cooperation with state and local governments, Indian tribes, environmental organizations, and citizens.

On the other hand, neither the idea of ecosystem management nor watershed management is widespread in Japan.[3] There are

some statutes managing water areas and wildlife, but they are in disorder. Japan does not have a unified legal system for watershed management. As a result, many watersheds have been easily destroyed and many species of wild aquatic animal, plants, and other life became extinct or are in danger of extinction. Salmon are no exception. Many species of wild salmon are in danger of extinction in Japan.

This article will focus on the legal system to protect salmon in the two countries. Although salmon habitat is widely distributed throughout the United States, this article uses the term "salmon" of the United States as the Pacific Salmon. By considering the complex situations surrounding salmon such as the role of the administrative agencies, the general public, law, and judiciary, from the viewpoint of comparison of the two countries, I will attempt to find a universal idea and technique for the ideal legal system to protect salmon. I hope this study will be useful to improve the Japanese legal system pertaining to salmon.

There are several reasons for discussing this topic at this time. First, in Japan, dams as instruments of river management are becoming the center of public attention. The existing dams have many problems. These past decades the accumulation of sand, soil, and sludge has been getting worse in many dams and it causes high risk of flood.[4] Some rivers, including the biggest rivers such as the Shinano River (Nagano and Nigata Prefectures) and the Oi River (Shizuoka Prefecture), have very low volumes of water because many hydroelectric power dams return quite little water or nothing to the rivers after they divert the water. They send the water to the next downstream hydroelectric power dams through underground tubes to use the diverted water repeatedly. The situation is so serious that people may even see completely dried up riverbeds in some parts of these rivers. Needless to say, the natural watersheds were totally destroyed in such areas. People have also started arguing about dams' enormous expense, their doubtful effect on flood control, and their negative effects upon nature. Some huge dam construction

projects are pending in courts such as the Nagara River Dam (Gifu and Aichi Prefectures), the Tokuyama Dam (Gifu Prefecture), the Eigenji 2nd Dam (Shiga Prefecture), the Tomada Dam (Okayama Prefecture), and the Kawabe River Dam (Kumamoto Prefecture). Recently, evolution has begun and some dam projects have begun to be reexamined.[5]

Second, there is concern about catches of anadromous (migrating) fish in Japan. The total catch of salmon in Japan has been decreasing the past few years since the largest record catch in 1996.[6] Especially, the catches of salmon and ayu[7] have decreased sharply in some rivers such as the Nagara River and the Iyoboya River in Honshu area. Moreover, the size of salmon is decreasing because of overstocking the rivers with artificial incubated salmon fries. Japanese government has been engaged in the artificial incubation of salmon since 1876, but has recently tried to reduce salmon artificial incubation projects. The United States, on the other hand, has been engaged in both wild salmon protection and artificial incubation projects. There is a positive and nationwide movement to remove dams to recover and protect watersheds and anadromous fish since Mr. Daniel P. Beard, the former Commissioner of the Bureau of Reclamation of the Department of the Interior, declared the end of the dam construction era in 1994. Japan should learn about balanced policy for salmon management from the United States.

Third, Japanese people need to reexamine the role of law and agencies to protect watershed and wildlife. The Ministry of Environment in Japan has been simply powerless to protect watershed ecosystems although it is expected to play a leading role in the field. In the United States, however, some agencies of both federal and state governments are very active in watershed management. The Fish and Wildlife Service of the Department of the Interior is playing an especially important role in designating endangered species, threatened species, and candidate species, and in studying and protecting their habitats under some statutes including the Endangered Species Act of 1973, the National Environmental Policy Act,

and the Clean Water Act. Thinking about watershed management and salmon protection in the United States will help Japanese people to reexamine the problems in Japanese current legal system and administrative system relating to watershed management.

Fourth, Japanese people should also reexamine the role of courts in natural resource management. In Japan, the courts play very little role to manage natural resources mainly because the standing and acceptable cases are restricted within very narrow limits by the law of legal procedure. In the United States, on the other hand, natural resource management cases are very common at courts and some important cases even change administrative policy dramatically. Courts' decisions have considerable influence upon natural resource management administration in the United States. Some parts of this dramatic role of the United States courts is already known in Japan through the famous nation-wide controversy of the Northern Spotted Owl.[8] There seems to be an analogy between the controversies of the Northern Spotted Owl and salmon from the aspect of the courts' role in changing administrative policy. It would be meaningful for Japanese people to study the role of courts through the Pacific Northwest Salmon cases, too.

Fifth, recently the matter of fishing rights of the Ainu people, the aborigines in Japan, came into question. The United States has a long history of study about fishing rights of native people. There are many important cases including the one in which the Supreme Court recognized certain fishing rights of native people in accordance with the treaties concluded between the Indian tribes and the United States government in the 1880s.[9] Definitely these studies and cases should be of much help to Japanese people in thinking about the Ainu people's fishing rights.

Sixth, the importance of watershed protection is gaining public attention in Japan. In 1997, Professor Takemichi Hatakeyama published an article, *The River Conservation Movement in the United States*, which examined an active movement to restore natural watersheds in the United States.[10] Professor Hiroaki Kakizawa

also has introduced the ecosystem management efforts of the United States Forest Service of the Department of Agriculture in his book.[11] However, there are few studies in Japan that examine the legal system and court involvement in the watershed management system of the United States besides these works. To know the details of watershed management in the United States will help Japanese people to think about what watershed management should be like in Japan.

I of this article presents basic biological information on salmon found in the Pacific Northwest of the United States and Japan. II shows the historical influence of economical development upon salmon and current problems of the two countries. III compares the legal system pertaining to salmon between these countries. IV concludes this article by suggesting how the Japanese legal system might be reformed to protect salmon.

I. Salmon in the Pacific Northwest and Japan

A. Pacific Northwest

There are six species of Pacific Salmon. They are Chinook, Coho, Sockeye, Steelhead, Chum, and Pink. Chinook is also called King or Black Mouth. Chinook is the largest of the Pacific Salmon, with some individuals growing to more than one hundred pounds, although most mature Chinook are under fifty pounds. It is one of the earlier salmon species to spawn in the fall. Coho is also called Silver and is a very popular sport fish. It is a powerfully built one and can jump falls that many other salmon cannot negotiate. It often spawns in the smaller streams and does not tend to use the larger rivers like Chinook. Sockeye is also called Red. It is the most flavorful and unique one because it requires a lake to spend from a few months to a couple of years when it is a young fish, called fry. Steelhead is the anadromous version of Rainbow Trout. Rainbow Trout remains in fresh water throughout its life, but Steelhead, which is a great fighting fish and a favorite of sports fishers, migrates

from the ocean into fresh water to spawn, and then swims back out to the ocean again. Chum is the second largest of the Pacific Salmon.[12] It is usually found in watersheds closer to salt water, and not in waterways far inland. Pink is the smallest of the fall-spawning Pacific Salmon averaging three to five pounds.[13]

Pacific Salmon species hatch and live during their early time in freshwater. They migrate to the ocean and stay there until they become fully-grown fish. When they reach spawning age, they return to their original freshwater streams to spawn. Salmon stop eating when they enter freshwater. A pair of salmon usually makes four or five redds[14] to spawn, although they can make up to seven. A female salmon selects and builds a redd with her body in the stream-bed and places thousands of roe in it. A male salmon quickly releases milt over the roe. The female salmon then rakes the loose gravel with her tail to cover the redd. Except for Steelhead, Pacific Salmon die soon after spawning.

Roe hatch out of the eggs in five to ten weeks. A fish just hatched out is called an alevin. It is fed by a yolk sac. As an alevin matures and looses its yolk sac, it is called a fry. Fry leave the gravel for the open water of the stream and eat aquatic insects. When a fry grows enough to migrate to the ocean, it is called a smolt. A smolt changes its physical condition to adapt to saltwater and migrate to the ocean. After years when a smolt becomes a fully-grown salmon, it comes back to the very stream to spawn where it originally hatched.

Each Pacific Salmon has a sphere of migration in the ocean. Some species like Pink stays close to shore,[15] but some species like Chinook travels as far as three thousand and five hundred miles. The length of stay in the ocean and spawning season depend on species and runs. Each salmon has its own size and color of roe and length of time to stay in fresh water. Chum and Pink stay in fresh water only for a week to a month, although Sockeye stays for twelve months to thirty-six months. Each salmon has several runs. Each returns to its river at a specific time of year. Biologically, Pacific

Salmon are grouped according to their runs (time to return) and race (river of origin).

The rivers, the upland watershed habitats, and the ocean all need to be kept in healthy condition since most Pacific Salmon are migratory fish and very sensitive to conditions during their life journeys.

In the streams, water is very important for salmon. Cool water is needed by salmon and their eggs.[16] Vegetation around a stream keeps the water cool and protects salmon from being seen by predators. There must be enough oxygen in the water for salmon to breath. Salmon are very sensitive to erosion and other forms of pollution, so water must be clean for salmon to live. Salmon must be assured good passage in the rivers during their long journeys, so dams can create serious problems for them. Reliable water flows, quiet deep pools, and adequate stream gradients are important factors in the creation of salmon habitat. Salmon need healthy stream substrate such as large boulders for shelter, cobble, and gravel for spawning nests. Large pieces of wood in a stream, such as logs and stumps, are very important to salmon, too. Large trees provide excellent shelter for salmon. Wood also changes the stream flows and gives salmon more habitat. On the other hand, too many large trees in a stream can create blockages and prevent migration. Needless to say, salmon need enough food to live. Newly hatched salmon fry feed on large food sacs on their bellies, but as they grow, they eat insects and their larvae.

The upland watershed habitats are also extremely important for salmon. Streamside and upstream vegetation are critical for watershed habitats. Removing streamside and upstream vegetation by clear cutting, for example, may cause erosion and degrade water quality. It also reduces shade, leading to many negative impacts on salmon habitat, including increases in water temperature. Too much direct sunlight might even cause the stream to dry up and leave young fish stranded. Removing streamside and upstream vegetation also reduces insect food for young salmon. It is said that at least

thirteen meters of vegetation should exist on either side of a stream channel to protect it against exterior influences, and to provide enough shade and food to keep the stream healthy. Healthy, stable stream banks with rooted vegetation are also needed to keep sediment from entering into the stream water.

The upland watershed habitats should not be over developed. Salmon are very sensitive to changes in water quality brought by agricultural, urban, and industrial pollution. Run-off water from driveways and rain gutters with chemicals, soap, oil, and other contaminants should be kept from flowing into the streams because they have direct impacts on salmon health. Removing too much water from streams to support irrigated agriculture, growing towns, and industrial activities also injures salmon. It not only makes it hard for salmon to migrate but also makes them easy prey for birds and other predators.

The upland watershed habitats should be protected from overgrazing. Too much fecal contamination is very damaging to water quality. Large numbers of animal can also cause erosion which silts the watershed habitat for salmon.

Exclusive of Alaska, the center of the salmon fishing industry of the United States is in the northwest States of Washington, Oregon, and Idaho. The Columbia River and its tributary the Snake River are famous for the largest spawning ground of salmon in the world.[17]

The Columbia River begins in the Selkirk Mountains in the center of British Columbia, Canada, and flows into the Pacific at Astoria in the State of Oregon. It is 1,450 miles in length and the area of its basin is about 259,000 square miles. It is second only to the Mississippi River in the United States and is almost equal to the area of the State of Texas. The Columbia River is well known for its great volume of water, said to be more than twice as much as the water of the Nile River in Egypt. The Snake River, the largest tributary of the Columbia River, begins in Yellowstone National Park in the State of Wyoming and joins the Columbia River at Kennewick in the State of Washington. It is 1,056 miles in length.

The area of its basin is about 109,000 square miles, which is bigger than the State of Colorado.

B. Japan

Seven species of anadromous salmon are well known in Japan. They are Chum, Pink, Sockeye, Masu, Coho, Chinook, and Steelhead.[18]

Chum is also called Sake (Shake), Akisake, Akiaji, or Shirozake. It is the most popular salmon in Japan because most of the salmon found in Japanese rivers and coasts are Chum. Its fry go down to the ocean from March to May of the year after hatching and come back to the original river from September to December to spawn after they have grown to 45-85 cm in four or five years. Pink is also called Karafutomasu, Masu, Aomasu, Rakuda, Honmasu, Seigomasu, or Sakuramasu. It is a small size salmon growing up to 40-65 cm and is found only in the rivers in Hokkaido Island and a part of Tohoku area near the Sea of Okhotsk and the Nemuro Channel. Its fry go down to the ocean from April to June of the year after hatching and come back to the original river from June to October to spawn at two years old. However, it is said that its migration ability is not as good as other kinds of salmon. Sockeye is also called Benizake. It is the most expensive salmon and there is no wild Sockeye in Japan. All of the Sockeye coming back to the several rivers in Hokkaido Island every year are artificially incubated Sockeye. Its fry stay in fresh water for one to two years after hatching. Then they go down to the ocean, come back to the original river from June to September to spawn at three to five years old, and grow to 30-70 cm. Masu is also called Sakuramasu. This salmon species inhabits only the Far East area and it does not travel as far as Chum. Its fry go down to the ocean after staying in the river for one to two years, come back to the original river from May to July to spawn at three to four years old, and grow to 30-60 cm. It spawns from September to October after staying in the river for two to five months. Coho is also called

Ginzake. Very few wild Coho are seen in the rivers and territorial waters of Japan. The artificial incubation of Coho started in 1975, but Coho has not taken root in Japan. Now Japan imports Coho eggs from the United States and raises them in crawls at the Sanriku coast in the Tohoku area. Chinook is the largest salmon, that reaches 150 cm at its maximum; it is also called Masunosuke, Suke, Osuke, Sukemasu, Daisuke, or King Salmon. The artificial incubation of Chinook started in 1881 but has not taken root in Japan. Although it is frequently caught in the territorial waters of Japan, it is not seen in Japanese rivers. Steelhead is also called Nijimasu and is one of the most popular fish raised in Japan. There are no wild Steelhead in Japan. Since 1877 it has been raised for food or sport fishing in freshwater fishponds and seawater crawls all over the country. However, recently some native fish are pressured by too many artificially incubated Steelhead. The effects of artificially incubated Steelhead upon ecosystem are becoming serious.

Japanese salmon's general migration pattern is similar to the Pacific Salmon's. Salmon fry hatch in a river and go down to the ocean. Each kind of salmon has its own length of stay in the river. The mileage of travel and length of stay in the ocean depends on the species. Salmon come back to their original river to spawn when they reach maturity.

However, in Japan, where the government has aggressively encouraged artificial incubation of salmon, most salmon returning to Japan are caught before they start to go up to their original rivers, and sold for food or shipped to the hatcheries to collect roe and milt for artificial incubation. Almost all rivers have dams without fish passes in Japan. Therefore, although Japanese salmon have migration ability similar to Pacific Salmon's, it is rare to see natural migration in the rivers where salmon eggs are artificially collected.

Just as Pacific Salmon, Japanese salmon also need clean and cool water, adequate boulders, cobble, gravel, large woody debris, and enough food in the streams. Healthy upland watershed habitat and ocean are also required. But they are not in good condition.

The situations of Japanese rivers are dramatically different from America's. There are about 3,000 rivers in Japan. Most rivers are quite short and very steep because the land is mountainous and narrow. It is very hard to find a natural river. In other words, most rivers were altered to control floods and to provide more water to agricultural, industrial, and urban activities. Consequently, the amount of water in rivers changes a lot according to seasons, weather, and the operation of dams. Water quality is not good, particularly in urban/developed areas. The removal of vegetation on upland watershed habitats continues all over the country.

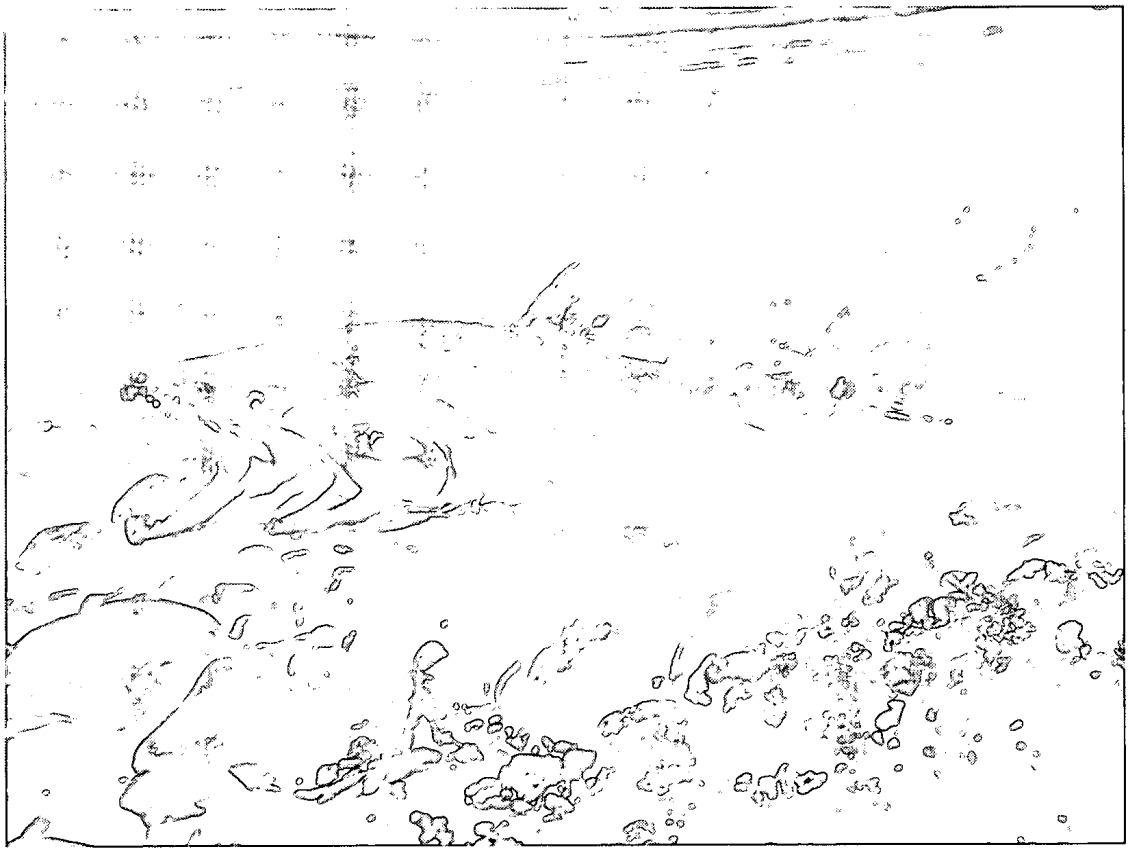
One of the causes of salmon habitat destruction is the Japanese government's fishery policy laying great stress on artificial incubation of salmon. The Japanese government has promoted artificial incubation since the 1800s. To artificially produce and constantly catch a large amount of salmon has been the ultimate purpose of the policy. The Japanese government neither took wild salmon into consideration nor protected its habitat. The Japanese government did not even investigate wild salmon well. Now, only a few Japanese rivers have riverbeds suitable for spawning.

The salmon rivers are distributed throughout the northeastern districts of Japan, including Hokkaido Island, the Prefectures of Aomori, Iwate, Miyagi, Fukushima, Ibaraki, Akita, Yamagata, Nigata, Toyama, and Ishikawa. According to data of the year 2000, the total catches of salmon in both rivers and in the ocean are 44,423,000 head. Hokkaido Island accounts for about 75 percent (33,547,000 head) of the total catches, and the ten Prefectures in the Honshu (the main island of Japan) account for about 25 percent (10,876,000 head). In the Honshu, three Prefectures facing on the Pacific Ocean (Iwate, Aomori, and Miyagi) account for about 93 percent (10,061,000 head) of the total catches of salmon caught in the Honshu.[19]

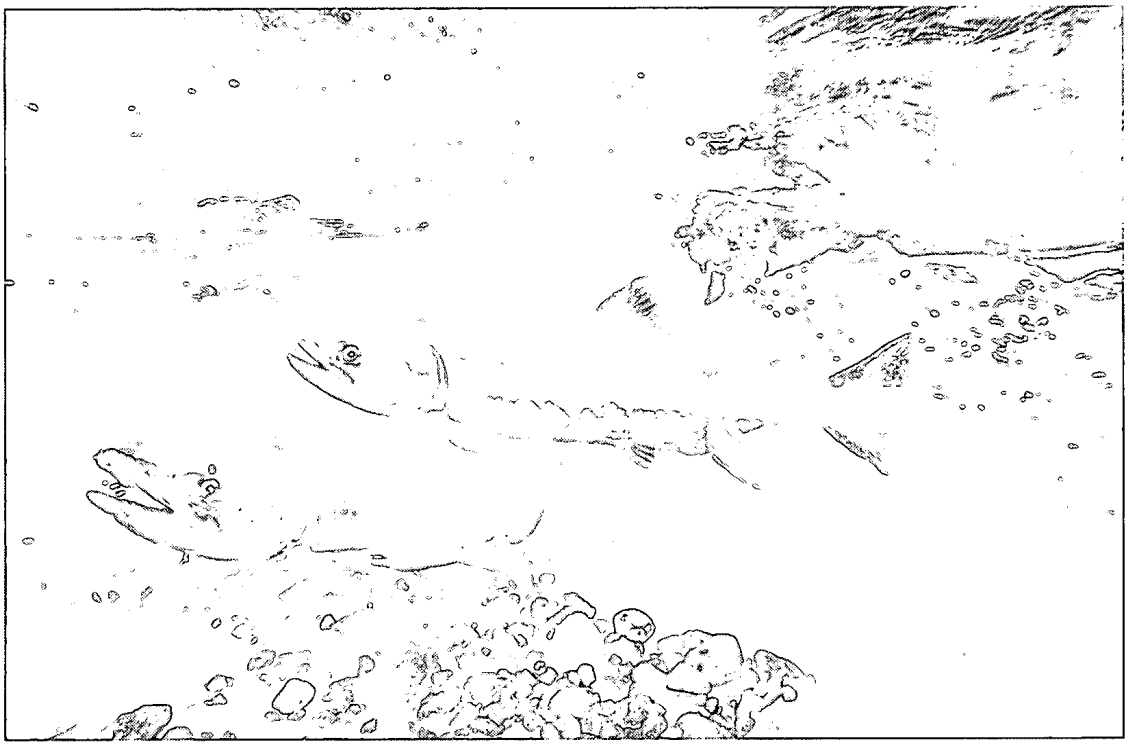
Japan once had a big industry of salmon fishing in rivers with dragnets. In the late nineteenth century, the river fishing industry for salmon declined with the rise of the ocean fishing industry for

salmon and artificial incubation projects of salmon. Commercial fishing of salmon in rivers ended in 1951 when the Marine Resources Protection Act forbade people from fishing for salmon in inland water areas.[20] From that time on, salmon rivers in Japan have been changed into the place to collect salmon eggs for hatchery. Now most of the salmon rivers have fences across the rivers to catch seed salmon without difficulty. In other words, most of the salmon coming back to their original rivers, including both wild salmon and hatchery salmon, are caught before they arrive at the spawning grounds and sent to the artificial hatcheries as seed salmon.

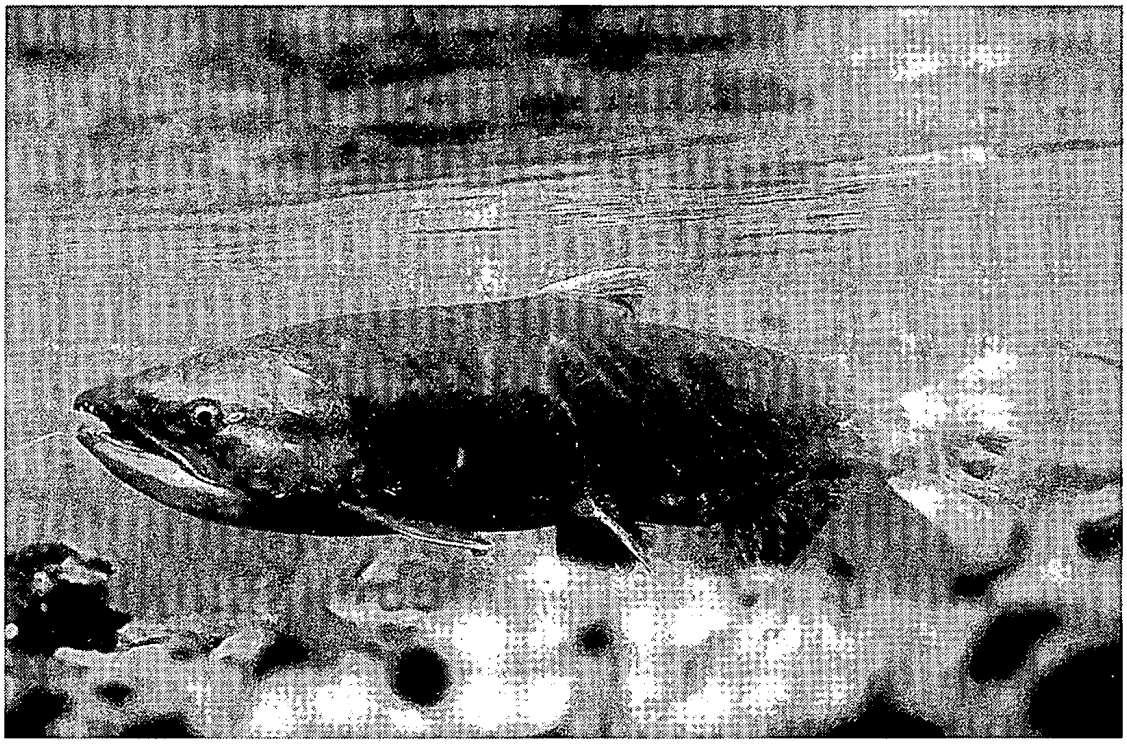
Now the main stage of Japanese commercial fishing of salmon is in the ocean. Fish hatcheries and fixed-net salmon fishing are seen near the coasts, and drift net salmon fishing is seen off shore.



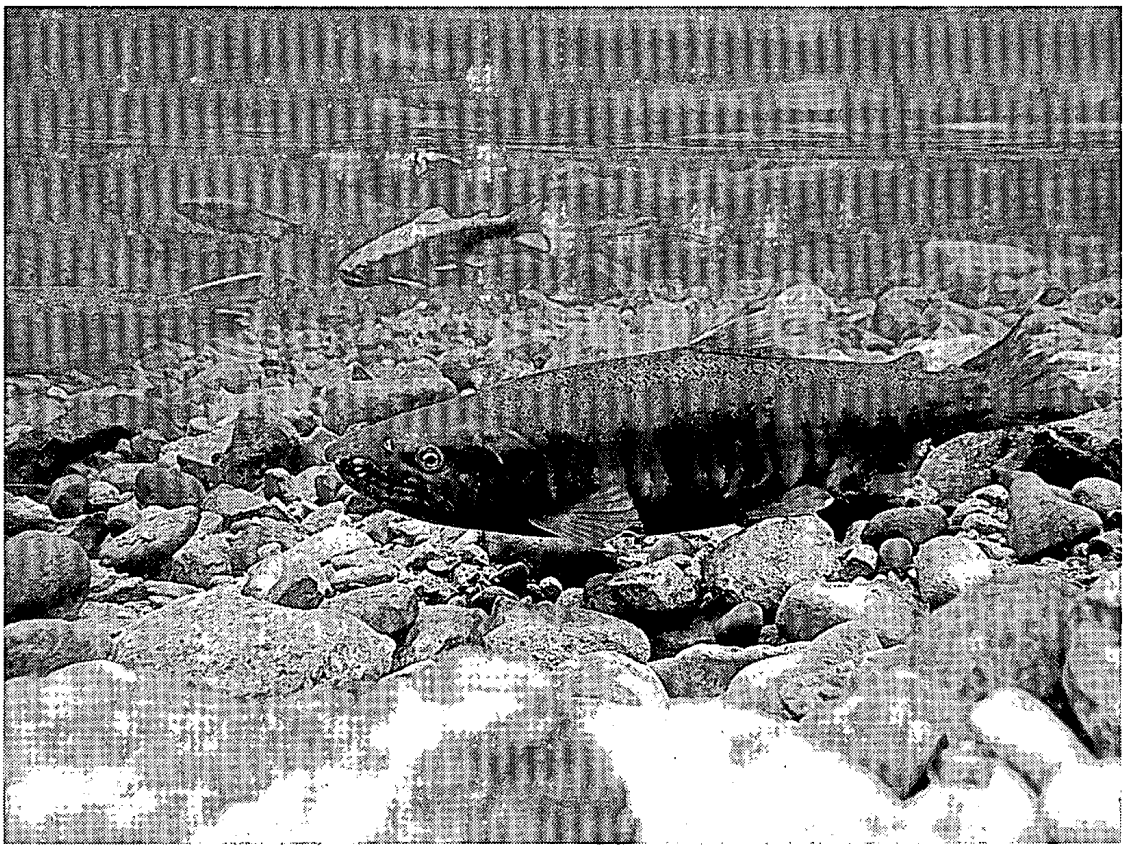
1. **Chum.** *Sapporo Salmon Museum*



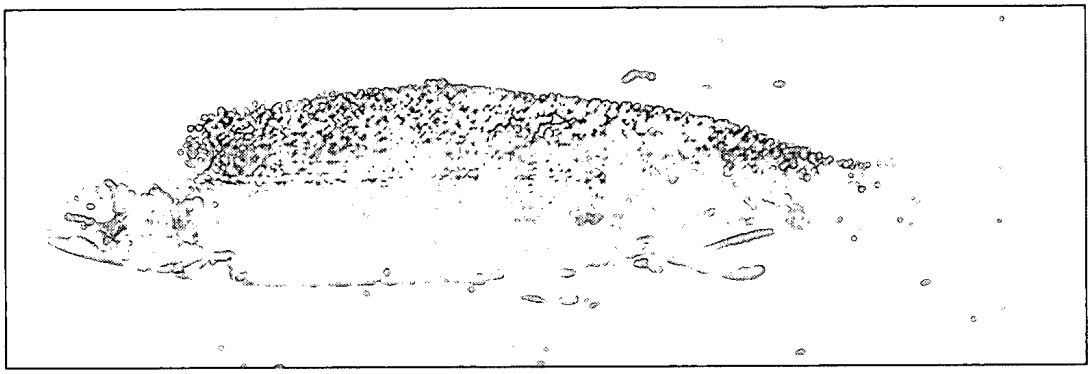
2. **Pink.** *Takashi Mori*



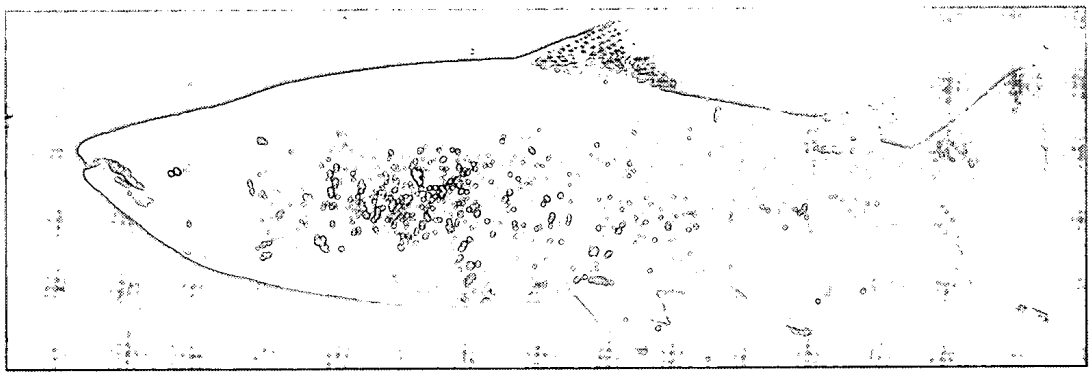
3. **Sockeye.** *Katsuya Misawa, Docon Co., Ltd.*



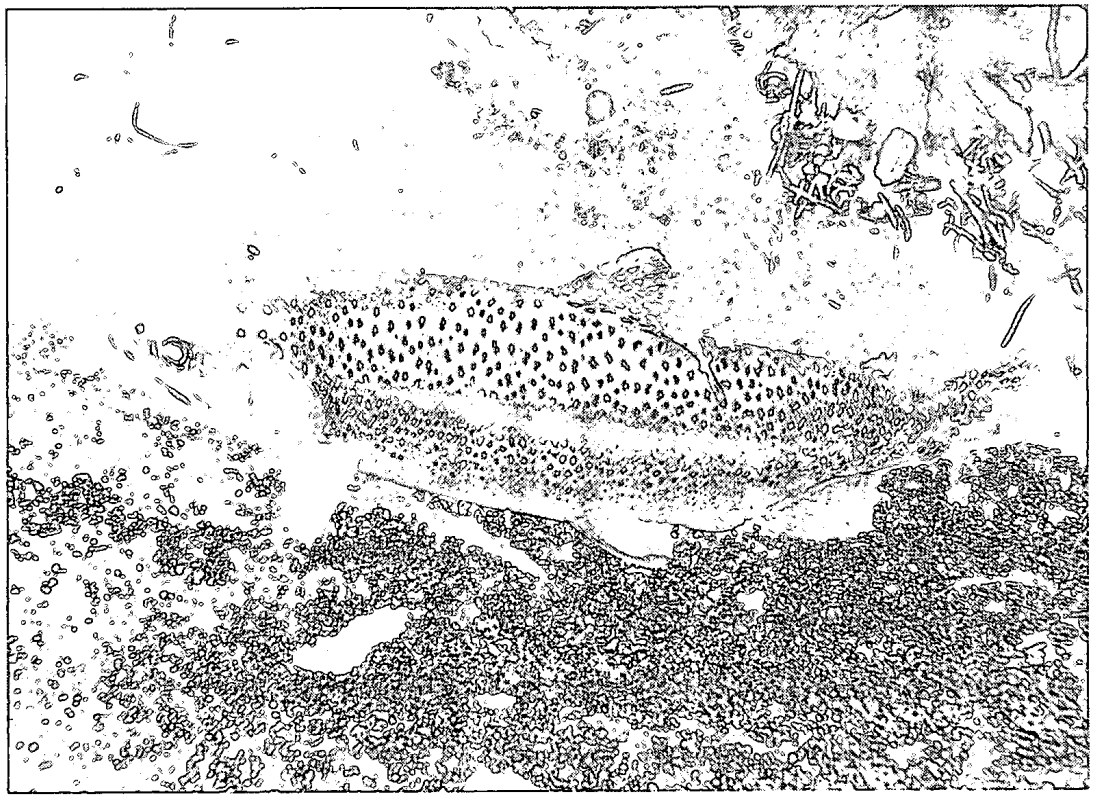
4. **Masu.** *Takeru Tsunoda*



5. **Coho.** *Sapporo Salmon Museum*



6. **Chinook.** *Sapporo Salmon Museum*



7. **Rainbow Trout.** *Takeru Tsunoda*

II. Salmon and Economic Development

A. Pacific Northwest

Several factors drove European people to the Pacific Northwest. In the eighteenth century, Russian traders, French fur trappers, and American explorers had already arrived in the area. The Lewis and Clark expedition party came down the Columbia River in 1805, followed by traders, fishermen, settlers, miners, and ranchers. The United States rapidly and drastically expanded its territory with unshaken faith in "manifest destiny".[21] The United States concluded some treaties with Indian tribes and succeeded in depriving them of vast land areas.[22] In 1848, gold ore was discovered in California and a lot of "forty-niners" rushed there.[23] In the mid-nineteenth century, Congress created new territories and states in the Pacific Coast area.[24] The development of transportation was also an important factor.[25] All of these factors brought European people west.

The European people who arrived at Pacific Northwest began to catch a large quantity of salmon. Two main factors spurred this activity. The first one was canning. It was a new technology introduced from Europe to preserve salmon, and it allowed much broader marketing of salmon.[26] The second one was the fish wheel which could mechanically dip fish out of the river (without assistance) if it was properly located.[27] With these two inventions, Chinook catch/production was in its prime during the year 1883 with 43 million pounds taken. Chinook declined after that. From 1870 to 1900, the Columbia River was a "free-to-all" era for fishing. However, in the late 1880s, this reckless depredation began to obviously effect salmon runs. Salmon did not come back to the streams in big swarms as before, and the canning industry along Pacific Coast declined gradually.[28]

In the Columbia River watershed, the biggest reason for salmon decline was the dam construction. During the 1930s, as a part of the New Deal, many dams were built to overcome economic crisis and to

furnish cheap electricity and water. It was during the dam construction era that the present Federal Columbia River Power System was built.[29]

Bonneville Dam, located on the lower Columbia River near Portland, Oregon, was started in 1933 and was completed in 1938. In 1937, the Bonneville Power Administration was established and authorized to sell electricity.[30] Moreover, a lot of huge dams like Dalles Dam (established in 1957), John Day Dam (in 1968), McCleary Dam on the lower Snake River (in 1953), Ice Harbor Dam (in 1961), Lower Monumental Dam (in 1969), Little Goose Dam (in 1970), Lower Granite Dam (in 1975), and Grand Coulee Dam (in 1941) were built in this watershed. In 1964, the Bonneville Power Administration, dam owners, and users of electricity concluded the Pacific Northwest Coordination Agreement which established a unified dam management system. Thereafter, the Columbia River and Snake River have been managed as the largest hydroelectric power system in the world with over 150 dams. This system supplies more than forty percent of the nation's hydropower. The Columbia River and Snake River have been completely changed to a series of placid pools and salmon habitats/passages cut into pieces. Those dams have destroyed more than fifty percent of salmon habitat.[31]

Besides dams, the formation of cities and towns and their associated industrial activities intensified the salmon habitat crisis. Farming, logging, ranching, and mining all joined to destroy salmon habitat. All of them polluted water. Farming decreased water flow through diversions for irrigation. Logging also created blockages to returning fish. Erosion from logging and ranching destroyed redds and prevented spawning.[32]

In the Pacific States, the mining boom started in 1848. The salmon habitats, including spawning grounds, were filled up with mud, silt, and sand as a result of mining activities. The water also became muddy. Salmon habitat in the Rogue River and the John Day River in Oregon was almost destroyed by such mining activities.[33]

Logging has a great effect on salmon habitat, too. In the early days, the operators of sawmills used to throw away a large amount of sawdust and chips of wood into the rivers. Sawdust and wood filled up rivers and polluted the water. In the late 1800s, the timber industry invented the splash dam. It used rivers as transportation routes for lumber. The great change of water flow, flushing lumber, and blowing up rivers with dynamite caused serious damage to salmon habitats. Thereafter clear-cutting became a widespread practice among timber industry. There was a large outflow of mud, silt, and sand from the site of clear-cutting. This outflow filled up the salmon rivers, polluted the water, and destroyed the spawning grounds.[34]

One of the main industries of the northwest United States is ranching. The ranchers used vast, dry public land as free ranches. Large numbers of cattle were let loose and they consumed most of the grass. The earth was then eroded by wind and rain, causing mud, silt, and sand to all flow into salmon rivers. The excrements of cattle polluted the water.[35]

The construction of agricultural irrigation canals also affected salmon habitat. The agricultural irrigation canals lowered the volume of water of salmon rivers. The complicated canals without screens confused salmon very much and they sometimes prevent salmon from going up to their original rivers.[36]

The indiscriminate hunting of beavers also caused destruction of salmon habitats. The dam and its reservoir made by beavers used to offer salmon very important healthy habitat, especially in arid land. However, beavers' dams disappeared as beavers were hunted until they almost became extinct by about 1900.[37]

Two major countermeasures were taken by the administrative agencies to cope with the decrease in salmon. First were the catch, gear, and season restrictions introduced by the States of Washington, Oregon, and Alaska. Second was operation of a salmon hatchery by the United States Fish Commission, the forerunner of today's National Marine Fisheries Service.[38] The first hatchery in Oregon

was built in 1877 on the Clackamas River to the west of Portland, Oregon.[39] The government built many hatcheries during the 1890s, but most of them were closed by the 1930s because it seemed that they were ineffective. The hatcheries were built again in the 1930s soon after the dam construction era begun. In 1938, the Michel Act was passed and forty modern hatcheries were established under the Act.[40] The government was rewarded with success in increasing hatchery fish and more than seventeen percent of returning adult salmon and Steelhead in the Columbia River basin are of hatchery origin now.

However, the success is problematic since now there is a struggle for existence of wild salmon versus hatchery salmon. The wild salmon are still precious for the Columbia River watershed ecosystem because they constitute very unique genetic resources. Their genetics are so complex that fish biologists have only begun to understand them. The wild salmon are stronger, taste better, and are smarter than hatchery fish in many cases. Above all, the mystery of wild salmon's life is worth being wondered at. But the wild salmon are in competition with the hatchery salmon for food and spawning grounds. The issue of the day is how we should operate hatcheries to be compatible with the protection of wild salmon.[41]

Many stocks/runs of wild salmon are already extinct and the existence of many salmon is threatened. In 1991 and 1992, two reports were published giving emergency warning about the wild salmon situation. A 1991 report by the American Fisheries Society indicated that 214 of about 400 stocks of salmon, Steelhead, and sea-run Cutthroat trout in the Northwest and California are at the risk of extinction. The report also indicated that 106 are already extinct.[42] A landmark study in 1992 titled "Pacific Salmon at the Crossroads: Stocks at Risk from CA, OR, ID and WA," identified 214 wild spawning salmon stocks that were at risk of extinction or of special concern, including 17 stocks that were already extinct.[43]

From 1990 to date, the United States Fish and Wildlife Service have designated seventeen stocks/runs of Chum, Coho, Sockeye, and

Chinook as threatened and endangered species according to the Endangered Species Act of 1973.[44] There are also some other kinds of salmon under consideration for listing.[45]

B. Japan

Salmon and Japanese people have a deep relationship from ancient times. Salmon is believed to be a source of protein of extreme importance for ancient people because a lot of salmon bones have been excavated from ruins of the Neolithic era (Jomon era) in Japan.[46] Native people "Ainu" living in Hokkaido Island deify salmon as one of their gods and have been calling it "Kamui-Chipp" which means the "fish of God." People caught salmon, smoked or dried it to preserve it for winter, or made shoes from salmon's tanned skin.[47] It is said that the rivers in Hokkaido Island were full of salmon in autumn until the Meiji era began in 1868 when the Japanese government started projects to develop the natural resources of the island.

In the Nara era (710-794) and the Heian era (794-1192), salmon was a first-class marine product that was used as a tax or a special present for the Imperial Court. The Imperial Court, received tons of salmon from all parts of Japan, used them in religious festivals or distributed them among government officials as salaries. In the Edo era (1603-1867), the catches of salmon had increased in the rivers of the eastern half of Japan and salmon became within the general public's reach. Both peers and commons used salmon as a year-end present or New Year's gift, and the custom continues still in Japanese society. The Nanbu Clan in Iwate Prefecture and the Echigo-Murakami Clan in Nigata Prefecture established the first regulation to manage rivers for protection of salmon. Named the "Tanekawa" system, it allowed for river repair/improvement works in order to put salmon spawning ground in good condition. The system placed restrictions on the salmon catch by setting up closed seasons and prohibiting fishing in certain areas.[48]

Japanese fishermen started to go abroad for fishing in the fifteenth century. The first government managed fishing ground in foreign countries was designated in Sakhalin in 1752. Japanese fishermen employed Ainu people for fishing there. In the Meiji era (1868-1912), Japanese people began to catch salmon not only in rivers but also in the ocean. The fishing grounds were extended into the Sea of Okhotsk, Bering Sea, and Gulf of Alaska. Moreover, Japanese fishermen began to fish in the Amur River,[49] Kamchatka Peninsula,[50] and Kurile Islands.[51] They began to fish in the open sea when the mother ship style of salmon fishing (Bosenshiki sakemasu ryo) was introduced, and the Japanese salmon fishing industry became bigger and bigger.[52] The development of transportation,[53] the Deep-sea fishery Encouragement Act of 1897,[54] and Russo-Japanese Fishery Treaty of 1907[55] were also other important factors to support the growth of the Japanese fishery of those days.

However, Japanese salmon fishing in the open sea began to be restricted after World War II. The United States prohibited Japan from fishing in most of the open sea in August 1945. Salmon fishing in the sea east of the one hundred and seventy-five degree of west longitude became impossible by the International Treaty of 1951. This treaty regulated the open sea fishery in the North Pacific between Canada, Japan, and the United States. The Russo-Japanese Fishery Treaty was concluded in 1956 and the size of Japanese salmon catches was regulated.[56] The Japanese salmon fishery suffered another heavy blow with a two hundred nautical miles limitation after 1976.[57] The Energy Crisis, the change of Japanese people's tastes, and the expansion of seafood imports also accelerated depression of fishery industry.[58]

Although the open sea fishery in the Pacific North was eliminated in 1992, the salmon catches of the coastal fishery have been on the increase. The annual catches amount to more than two hundred thousand tons. But it is not even enough to meet the national demand for salmon, so now Japan imports more than two hundred thousand tons of salmon a year from foreign countries such as

Canada, the United States, and Chile.

The Sayamaike Dam on the Nishiyoke River is said to be the first dam in Japan which was built in the sixth century for the purpose of ensuring water for agricultural use.[59] After that, some dams and reservoirs were built in various places, especially in the Setonaikai area. The Nunobiki Dam on the Ikuta River was the first modern dam, built in 1900 for the purpose of ensuring city water for Kobe in Hyogo Prefecture. In 1938, Tsukabaru Dam was built on the Mimi River with modern construction techniques. However, the dam construction was interrupted when World War II began.

Dam construction was resumed after the World War II following the way of the Tennessee Valley Authority of the United States. The purposes for those dams at that time were to prevent floods and to make more electric power in order to stimulate the local economy. The National Land Synthetic Development Act of 1950 was enacted to promote local development by dam construction. Then an Act to promote the development of hydroelectric power sources was enacted in 1952. After that, some large-scale dams like Sakuma Dam on the Tenryu River (Nagano and Shizuoka Prefectures)[60] and Kurobe Dam on the Kurobe River (Toyama Prefecture) were built one after another. In the 1960s, thermal power generation became the mainstay of power generation and the importance of the hydroelectric power station fell. However, in the high economic growth era (from 1955 to 1973), the population and factories suddenly increased in some metropolitan areas and water became scarce in supply almost every year in those areas. Multipurpose dams that function both to ensure city water and to control flood made an impressive appearance.

Today, dam construction is limited because of the decrease in appropriate dam building sites, long construction time, the increase in construction expenses owing to the increase in compensation amount, and counter movements by municipalities and inhabitants. After the oil crisis (1973), some areas even have a surplus of water as a result of the sluggish investment in plants and equipment, the increase in electricity conservation, and the decrease in agriculture. In those

areas, no dam will be needed to develop a source of water supply or to secure water resources. Recently the Japanese government's policy in increasingly denounced because it keeps investing huge amounts of money in many dam projects in spite of financial difficulties.

Moreover, the Japanese government is denounced because there is great anxiety about the long-term heavy damage to watershed ecosystems which dams may cause.[61] Dams have serious effects upon the watershed. First, dams destroy vast habitat of wild animals and plants. The river becomes wide and deep upstream of dams. A reservoir is not a suitable habitat for some wildlife because the bottom of it is very cool, oxygen-poor, and sunlight-poor. On the other hand, on the surface of it, the water temperature is high and the water is salty. The river downstream of dams becomes narrow and shallow. The water temperature is warmer, and sometimes, not even a drop of water can be found in the river. Second, dams can be fatal to migratory fish. Most dams in Japan do not have fish ladders. Fish ladders do not work well even if some dams have them because they are not fully supervised. Dam operators do not consider the needs of young fish. In spring and early summer, young fish need enough water and adequate speed of flow to go down to the ocean in a certain time period. However, dam operators close sluices of dams to keep water for summer. Needless to say, the migratory fish decrease, and at the same time, animals such as eagle, owls, and weasels that prey on those fish decrease too. Third, dams badly change the watershed circumstance downstream. Dams interfere with transportation of earth, sand, and rocks from upstream to downstream. Eroded by water and not supplied with earth, sand, and rocks, downstream areas become deep canyons. Healthy spawning grounds also disappear.[62]

In the United States, salmon are recognized as wildlife and as an important feature of the environment. It is common knowledge how deeply wild salmon depend on a healthy environment for their existence. In Japan, in other hand, this idea is not widely accepted even

though it is supported by scientific research. There are many Japanese salmon that are hatchery fish. There are also some wild runs such as in Hokkaido Island where salmon exist nature apart from hatcheries. These salmon are wildlife as bears, eagles, and whales, although many Japanese people do not recognize it. In a similar way, both wild salmon and hatchery salmon depend on healthy habitats. The wild salmon must have a clean, healthy river system for their whole existence. In the case of hatchery salmon, they spend their early life in hatcheries, but they are also completely dependant on healthy aquatic habitats for their existence after they released into rivers.

Since the 1960s, the growing economy has brought with it environmental pollution and development activities of various kinds. The water is polluted all the time by drains from factories and homes, and chemicals from farms, livestock farms, roads, gas stations, and so on. In Hokkaido Island, for example, many starch factories and beet factories were built along the rivers and the water was polluted with their organic waste. The riverbeds were covered with water bacterium. The developers' activities such as forest felling, constructions of highways, and development of skiing grounds and golf courses in upper stream areas are progressing still now without consideration of their potential effect upon watersheds. River works also destroy healthy habitat for fish. River works for flood control (levee works) make rivers straight so that their water quickly reaches the ocean. River works for urbanization, irrigation and gravel collection cause the decline of water level and serious sedimentation. Rivers have been straightened and riverbanks and riverbeds have been covered with concrete. Then not only fish but also most of the insects, water plants, and birds have disappeared.

The recursive character of salmon was well known among Japanese people by the eighteen century.[63] The attempts to reproduce salmon can be divided into two steps in Japan. The first attempt was the above-mentioned "Tanekawa" system to support natural multiplication in the Edo era (1603-1867). The second

attempt was the artificial hatching which was introduced into Japan in the nineteenth century. The artificial hatching technique for salmon and trout was introduced from the United States by Akekiyo Karasawa in 1876.[64] As soon as he returned to Japan, Karasawa established hatching farms close to Tokyo and hatched salmon and trout.[65] Then the artificial hatching technique was introduced all over the country in about six years time.[66] At the same time, Japan also imported some needed canning machines and fishing nets.[67]

Since the 1970s, the number of Chum catches has been rapidly growing.[68] Japan depends on the artificial hatchery salmon for the large part of the salmon catches. And now this "agricultural fishing" idea is being applied to the artificial hatchery of red sea bream, flatfish, ear shell, sea urchin, prawn, and so on.[69]

Unlike the United States, no salmon is designated as a threatened or endangered species under the Endangered Species Act of 1992 in Japan. But this does not mean that there are no threatened or endangered salmon in Japan.[70]

Several problems related to salmon are recently becoming serious. First, the number of salmon is decreasing. For example, there were eleven million Chum caught near Hokkaido Island in 1889, but the catch decreased to three to five million by 1960. Second, the development and success of artificial hatchery has caused managers to treat natural river watersheds lightly. The reason is that they think artificial hatchery fish depend less on natural watersheds because the young salmon are fed and kept in hatcheries a long time before they are stocked in the rivers, and the ripe salmon are caught at the mouth of the rivers. Third, the hereditary diversity of artificial hatchery salmon will decrease. Fourth, the salmon's nature will turn offensive in the case of an artificial hatchery salmon. Hatchery salmon tend to ignore other salmon's territory. They are barren and lack adaptability. Fifth, it is possible that the artificial hatchery salmon will infect wild salmon with diseases. Sixth, sometimes even an increase in hatchery salmon will cause a decrease in the population of wild salmon. If the number of hatchery salmon increase,

people begin to catch more salmon, and more wild salmon will be unconsciously caught because people do not distinguish wild salmon from hatchery salmon.[71]

Notes

1. Takemichi Hatakeyama & Hikaru Suzuki, *What has happened to the Northern Spotted Owl in the Pacific Northwest America? : The Formation of Agreement in the U.S. National Forest Management and the Function of Justice*, vol. 46 no. 6 Hokudai Hogaku Ronshu (The Hokkaido Law Review) 2003-2066 (1996). About the affinity and difference between salmon and Northern Spotted Owl issues, see generally Keith C. Petersen, *River of Life Channel of Death: Fish and Dams on the Lower Snake* 196 (Oregon State University Press 2001).
2. Douglas S. Kenney, *Resource Management at the Watershed Level: An Assessment of the Changing Federal Role in the Emerging Era of Community-Based Watershed Management* 1 (Natural Resources Law Center, University of Colorado School of Law 1997). Watersheds have some critical functions for life. For example, they (a) provide habitat for aquatic animals, plants, and other lives; (b) provide drinking water and food resources; (c) assimilate and purify contaminants in air and water; and (d) convey a large quantity of water and humidity to wide area and control climate. Recently, watershed management is drawing public attention. Watershed management means to protect the entire watershed including water flow, aquatic animals, plants, and other lives, forests, river mouths, seashores, and inanimate environment supporting the watershed (rock, sand, air, etc.).
3. Academic research on the ecosystem and watershed management of the United States has just started in Japan. Professor Hiroaki Kakizawa introduced the historical development of the United States Forest Service's ecosystem management activities in the national forests. Professor Kakizawa also mentioned about the

germination of watershed management projects in the northeastern states of the United States. Hiroaki Kakizawa, *Ecosystem Management* (Tsukijishokan 2000).

4. On November 18, 2002, an article on the accumulation in dams appeared at the top of the front page of a Japanese leading newspaper *Asahi*. It says, "in Japan, 44 of 782 middle size or large size dams (the total volume of water to be kept in these reservoirs is one million cubic meter) are already half filled with sand, soil, and sludge. 124 of 782 dams are twenty percent or more filled. Most of them are hydroelectric power dams." There are some secondary problems. The coastline around river mouths retreats into inland because of the short supply of sand and soil from upper streams. There is a risk of flood around and upstream of those filled dams. If the dams' gates are opened to release accumulated sand and soil, the fishing grounds in downstream and river mouth will be greatly damaged by large quantity of sludge". The Head Office of the Asahi Newspaper (Tokyo), *More than half of Forty-four Dams are buried*, Asahi Shinbun front page (November 18, 2002); The Head Office of the Asahi Newspaper (Tokyo), *Rivers were Cut into Peaces by Dams and "Dead": The High Price for the Development of Power Sources*, Asahi Shinbun second page (November 18, 2002).
5. The Japanese government discontinued 22 dam projects since 1996. Local governments also began to reexamine their dam projects recently. For example, on December 3, 2003, the governor of Gunma Prefecture discontinued the Kurabuchi dam project on the Karasu River which started in 1980. The dam was to be the second largest one in the prefecture with a 11.6 million tons reservoir. The prefecture has already paid 16 billion yen for the project. The decision seems to be influenced by the fact that some nests of Japanese golden eagles (Inuwashi), a natural monument designated by the Japanese government, were found in the project site. On December 5, 2003, two governors declared to stop their dam projects. The governor of Iwate Prefecture

discontinued the Tsuzuki dam project on the Omata River which started in 1981. The dam was to be completed in 2008 with a 10.5 million tons reservoir. On the same day, the governor of Saitama Prefecture decided to withdraw from the Tokura dam project on the Katashina River in Gunma Prefecture which started in 1982. The Tokura dam is being constructing by the Japan Water Agency (the former Water Resource Develop Corporation). It will be the third highest dam in the country with a 92 million tons reservoir. 28 billion yen has already spent for the project. The estimated total expense of the project is 123 billion yen. The Japanese government, the city of Tokyo, and Saitama Prefecture were going to pay most of the expense. On December 8, 2003, however, the governor of Tokyo decided to withdraw from the Tokura project. If this project is discontinued, it will be the first case to stop a half-completed dam project financed by the national government. The decisions seem to be also influenced by the fact that some parts of the project site locates in the Nikko National Park which includes important habitats for Mountain Hawk Eagle (Kumataka), one of the domestic rare wild animal species designated under the Endangered Species Act.

6. The salmon catches have established the highest on record in 1996. It sharply declined after that, then increased in 2001 and 2002. For more detail information upon salmon catches, visit The National Salmon Resource Center, *A Change of Stocked Salmon Number, Salmon Catches, and Returned Salmon* <http://www.salmon.affrc.go.jp/zousyoku/ok_relret.htm>.
7. Ayu is an emblem of the beginning of summer in Japan. Ayu's fry goes up rivers in spring and grows up in midstream. Ayu goes down to downstream to spawn from autumn to winter. Ayu has only one year life.
8. Hatakeyama & Suzuki, supra n.1.
9. Charles F. Wilkinson, *The Northwest Indian Fishing Decisions: Luminous Events in Ninth Circuit History*, 14 Western Legal History 19-27 (Winter/Spring 2001) is one of the best articles to

learn the historical Indian fishing rights cases held by the United States Supreme Court. Japanese translation of the article is Charles F. Wilkinson, *Environmental Law and Policy in the United States of America (1) — The Northwest Indian Fishing Decisions: Luminous Events in Ninth Circuit History, 14 Western Legal History 19-27 (Winter/Spring 2001)* —, vol. 39, no. 1 Hogaku Kenkyu (The Hokkaigakuen Law Journal) 103-116 (2003) (Suzuki Hikaru trans.).

10. Takemichi Hatakeyama, *Kasen Kankyo Hozen wo Mezasu America (The River Conservation Movement in the United States),* 199 Gunshuku Mondai Shiryo 18-23 (1997).
11. Kakizawa, supra n. 3.
12. Chum is also called Dog salmon. There are two explanations for the nickname. One says that it is because the Eskimo people feed Chum to their dogs. Another one says that it is because a male Chum develops large teeth like canine teeth during the spawning period. The basic information of Pacific Salmon in this article are based on the literatures as follows: Natalie Fobes, Tom Jay & Bred Matsen, *Reaching Home: Pacific Salmon, Pacific People* (Alaska Northwest Books 1994); Keith C. Petersen, *River of Life, Channel of Death: Fish and Dams on the Lower Snake* (Oregon State University Press 1995); Joseph Cone & Sandy Ridlington, *The Northwest Salmon Crisis: A Documentary History* (Oregon State University Press 1996); Jim Lichatowich, *Salmon Without Rivers: A History of the Pacific Salmon Crisis* (Island Press 1999); Joseph E. Taylor III, *Making Salmon: An Environmental History of the Northwest Fisheries Crisis* (University of Washington Press 1999); Rik Scarce, *Fishy Business: Salmon, Biology, and the Social Construction of Nature* (Temple University Press 2000); Michael C. Blumm, *Sacrificing the Salmon: A Legal and Policy History of the Decline of Columbia Basin Salmon* (BookWorld Publications 2002); Edward C. Wolf & Seth Zuckerman, *Salmon Nation: People, Fish, and Our Common Home* (updated ed., Ecotrust 2003); David R. Montgomery, *King*

of Fish: The Thousand -Year Run of Salmon (Westview Press 2003).

13. A male Pink salmon develops a large hump on its back during the spawning period, hence the nickname Humpback salmon.
14. Redd means a spawning nest of a fish, especially salmon or trout.
15. Pink travels more than one hundred and fifty miles in the ocean from its natural river, but it rarely travels far upriver to spawn.
16. For one of the latest academic information upon the importance of cool water for salmon, see Craig N. Johnston, *Salmon and Water Temperature: Taking Endangered Species Seriously in Establishing Water Quality Standards*, vol. 33: 15 Lewis & Clark Law School Envtl. L. 151-172 (2003).
17. Charles F. Wilkinson & Daniel Keith Conner (Student Author), *The Law of the Pacific Salmon Fishery: Conservation and Allocation of a Transboundary Common Property Resource*, 32 U. Kan. L. Rev. 17, 17 (1983).
18. The basic information of Japanese salmon in this article are based on the literatures as follows: Masahide Kaeriyama, *Saishin no Sake gaku (The latest Salmon Study)* 76-111 (Seizando Shoten 2002); Satoshi Ida & Fumiya Okuyama, *Sake Masu Gyorui no Wakaru Hon (Understanding the Salmon and Trout)* 102-145 (Yama to Keikokusha 2000); Keiji Kadowaki, *Kita no Sakana Monogatari (A Northern Fish Story)* 79-88 (Hokkaido Shinbunsha 1991); Masahide Yuma & Kazumasa Ikuta, *Hotaru to Sake (Lightning Bug and Salmon)* 32-36, 75-109 (Iwanami Shoten 2000); Shigekatsu Sato, *Sake —— Tsukuru Gyogyo eno Chosen (Salmon —— A Challenge to the Agricultural Fishery)* 63-69, 135-191 (Iwanami Shoten 1986). We have ten salmon genera all over the world, and four of them are seen in Japan. There are nineteen species in the four genera including non-anadromous salmon. They are Chum, Pink, Sockeye, Masu, Coho, Chinook, Steelhead trout (or Rainbow trout), Red-spotted Masu, Biwa, Brown trout, Dolly Varden, Miyabe's char, White-spotted char, Nikko Iwana (Japanese char), Yamato Iwana (Japanese char), Head-spotted

char, Brook trout, Lake trout, and Japanese huchen.

19. For more information, visit the National Salmon Resource Center's website, supra n. 6.
20. §25, the Marine Resources Protection Act, Law No. 313 of 1951.
21. The United States enlarged its territory mainly by the purchase of Louisiana in 1803, annexation of Texas in 1845, the Oregon compromise in 1846, cession from Mexico in 1848, and the Gadsden purchase in 1853.

The first important step toward territorial expansion of the United States was the purchase of Louisiana. President Thomas Jefferson acquired it from Napoleon Bonaparte through negotiations. French people settled in Louisiana first. It became Spanish territory from the end of French-Indian War in 1763, then became French territory again. President Jefferson negotiated with France about the purchase of Louisiana because Napoleon's advance to Louisiana was a menace to the United States at that time. Unexpectedly, France offered to sell the whole area of Louisiana. In 1803 President Jefferson succeeded in purchasing the Louisiana of 532.06 million acres for 15 million dollars. In other words, it was only three cents per acre. It was the largest realty trade in the world and made the territory of the United States double.

The Republic of Mexico became independent from Spain in 1821 and acquired Texas as its territory in 1824. The Republic of Mexico enacted an Act in 1825 to encourage settlement from the United States. Consequently, more than twenty thousand citizens of the United States and thousands of slaves settled in Texas by 1830. In 1830, the Republic of Mexico enacted an Act to prohibit the United States citizens from settling and slavery, but it did not work well. The citizens of the United States settled Texas started a movement for an independence in 1835. After about a one-year battle, the Independent Republic of Texas was established in October 1836. Texas was annexed to the United States in 1845, but Texas was allowed to hold its own

land. Joint Resolution for the Admission of the State of Texas into the Union, Resolutions No. 1, 9 Stat. 108 (1845). Five years later, Texas sold the 78.8 million acres land located in the west and north to the United States for 10 million dollars. The land includes some parts of present states of New Mexico, Oklahoma, Colorado, and Kansas.

Oregon was a common possession of the United States and the United Kingdom since October 20, 1818. Oregon Trail increased westward settlers dramatically in the early 1840s. In 1846, the United Kingdom accepted the request of the United States to fix the boundary at the forty-nine degree north latitude. Treaty of June 15, 1846, with Great Britain confirmed the claim of the United States to some 181 millions acres of territory embracing the present states of Oregon, Washington, and Idaho, and parts of Montana and Wyoming, and defined the northern boundary of the territory. Treaty with Great Britain, in regard to limits westward of the Rocky Mountains, 9 Stat. 869-870 (1846). It was the first time that the United States acquired the land along the Pacific coast.

The boundary dispute between the United States and the Republic of Mexico lasted two years since 1846. General Winfield Scott and his party advanced against Mexico City and succeeded in bringing the capital under their control. The United States concluded the Guadaloupe Hidalgo Treaty with the Republic of Mexico in February 2, 1848 and purchased the southwest fertile land from the government of the Republic of Mexico. At the same time, the treaty transferred the 339.66 million acre land located in north of the Gila River and west of the Rio Grande to the Unites States. Treaty of Peace, Friendship, Limits, and Settlement with the Republic of Mexico, 9 Stat. 922-943 (1848).

Furthermore, the government of the United States purchased the 18.97 million acre desert area located in the low land in south of the Gila River from the government of the Republic of Mexico for ten million dollars in 1853 in order to construct a railroad

(Southern Pacific route). It was named Gadsden Purchase after the ambassador James Gadsden to the Republic of Mexico who succeeded to arranging the trade. The territory of the United States was almost brought in present form after this trade.

22. In May 28, 1830, the United States Congress passed an Act to force all of the Indian people living on east of the Mississippi River to move to the west. An Act to provide for an exchange of lands with the Indians residing in any of the states or territories, and for their removal west of the river Mississippi, Chap. CXLVIII, 4 Stat. 411 (1830). Having legal ground under this act, the government of the United States started to acquire a great deal of land from Indian people. In the 1840s, in order to avoid conflict, the United States government proposed to Indian tribes that they should cede their land where conveniently situated and non-Indian people want to settle. Many treaties were concluded between Indian tribes and the United States government. The four main treaties among them brought more than 35 million acre land to the United States: (a) Treaty between the United States and the Walla Walla, Cayuses, and Umatilla Tribes and Bands of Indians in Washington and Oregon Territories, concluded on June 9, 1855, 12 Stat. 945-950 (1855). These tribes are now known as the Confederated Tribes of the Umatilla Indian Reservation; (b) Treaty between the United States and the Yakama Nation of Indians concluded on June 9, 1855, 12 Stat. 951-956 (1855). These fourteen bands and Yakamas are now known as the Confederated Tribes and Bands of Yakama Indian Nation; (c) Treaty between the United States of America and the Nez Percé Indians, concluded on June 11, 1855, 12 Stat. 957-962 (1855). It is now known as the Nez Percé Tribe; and (d) Treaty between the United States and the confederated tribes and bands of Indians in Middle Oregon, concluded on June 25, 1855, 12 Stat. 963-970 (1855). These bands and tribes are now known as the Confederated Tribes of the Warm Springs Reservation of Oregon.

Moreover, there are five treaties in the same era: (e) Supple-

mentary Article to the Treaty with the Creek Tribe of Indians made and concluded at Fort Gibson on the twenty-third day of November, in the eighteen hundred and thirty-eight, June 13, 1854, 11 Stat. 599-600 (1854); (f) Treaty between the United States and Dwâmish, Suquâmish, and other allied and subordinate Tribes of Indianin Washington Territory, concluded on January 22, 1855, 12 Stat. 927-932 (1855) (Point Elliott); (g) Treaty between the United States of America and the S'klallams Indians, concluded on January 26, 1855, 12 Stat. 933-937 (1855) (Point No Point); (h) Treaty between the United States of America and the Makah Tribe of Indians, concluded on March 8, 1859, 12 Stat. 939-943 (1855) (Neah Bay); and (i) Treaty between the United States and the Qui-nai-elt and Quil-leh-ute Indians, concluded on the Qui-nai-elt River, in the Territory of Washington, July 1, 1855, and at the city of Olympia, January 25, 1856, 12 Stat. 971-974 (1855).

23. In January 1848, gold ore was discovered along the American River in California. A lot of "forty-niners" rushed to California in 1849 and it brought Gold Rush.
24. In 1848, Congress created the Oregon Territory. An Act to establish the Territorial Government of Oregon, Chap. CLXXVII, 9 Stat. 323-331 (1848). In 1859, Oregon became a State (Oregon State wood). An Act for the Admission of Oregon into the Union, Chap. XXXIII, 11 Stat. 383-384 (1859). In 1850, California became a State. An Act for the Admission of the State of California into the Union, Chap. L, 9 Stat. 452-453 (1850). In 1853, Congress split off the Washington Territory as a separate unit. An Act to establish the Territorial Government of Washington, Chap. XC, 10 Stat. 172-179 (1853).
25. Wagons began to move across the Oregon Trail in the early 1840s. The Oregon Trail is a road of 3,200 km which connects Independence, Missouri, with Oregon. At the time, Oregon meant the land between forty-two degree north latitude and fifty-four degree and forty minutes north latitude. The construction of the Union Pacific and Central Pacific railroad lines

brought the first transcontinental railroad.

26. Refrigeration and salt were the main ways to preserve salmon before the canning technique was invented in France in 1809. The first salmon canning factory along the Columbia River was established in Oregon in 1866 and the technique has quickly become popular among the Oregon and Washington. The salmon cans sold remarkably well because they were delicious in comparison with refrigerated or salted salmon. The whole people living in the area, including non-fishermen, were very involved in catching salmon and the salmon canning industry in the Pacific Coast area has made striking progress in a short time. Charles F. Wilkinson, *Crossing the Next Meridian: Land, Water, and the Future of the West* 187-190 (Island Press 1992).
27. A fish wheel is also called a salmon wheel. It is "a device for catching salmon in large quantities consisting of a large revolving wheel suspended in the water and turned by the current to which are attached scoop nets that catch the fish passing beneath." Philip Babcock Gove, *Webster's Third New International Dictionary of the English Language Unabridged* 2004 (G. & C. Merriam Company 1976). Salmon catches got greater and greater after fish wheels were introduced between 1879 and 1880. Anybody who wanted to become a rich could realize his or her dream if only he or she sets a fish wheel in a good location in a salmon river. There was a keen competition in salmon fishing. Wilkinson, supra n. 26, at 189-190. On the other hand, fish wheels have not spread all over in Japan. There are only two fish wheels in Hokkaido Island. One is located in the Chitose River. It was introduced by Kazutaka Ito, a former responsible person of a hatchery in Chitose. He introduced it after he studied it in the Columbia River. The fish wheel located in Chitose is the oldest one in Hokkaido Island established in November 1896. At first it was called "a fish wheel" same as in the United States, but since about 1965 it has been called "an Indian wheel" because it easily reminds people of the Columbia

River and the salmon fishing by Indian people. The purpose of establishing the fish wheel in the Chitose River is not only to catch salmon as food but also to collect roe and milt for artificial hatchery. So the fish wheel is set up only for three months from late August to late November and it catches about three hundred thousand salmon per year. Another fish wheel in Hokkaido Island is located on the Nukibetsu River in Toyoura.

28. In the late 1880s, the depredations began to be reflected in the diminished size of the spring and summer Chinook runs. The canning industry fell into decline all along the Pacific Coast. The last canning industry at Sacrament River was closed in 1919.
29. They are dams for energy development, stock ponds, tailing ponds, private irrigation reservoirs. The natural landscapes of Washington, Oregon, and Idaho were largely affected by the hydropower developments. Almost all main rivers in the Columbia River watershed have dams finally.
30. An Act to authorize the completion, maintenance, and operation of Bonneville project for navigation, and for other purposes, Pub. L. No. 329, Chap. 720, 50 Stat. 731 (1937). The Bonneville Power Administration is "a federal agency, under the United States Department of Energy, that markets whole sale electric power and operates and markets transmission services in the Pacific Northwest. The power comes from 31 federal hydro projects, one non-federal nuclear plant and several other non-federal power plants. The hydro projects and the electrical system are known as the Federal Columbia River Power System." The Bonneville Power Administration's service area size is about "300,000 square miles, including Oregon, Washington, Idaho, western Montana, and small portions of Wyoming, Nevada, Utah, California and eastern Montana." More detail information about the Bonneville Power Administration is available at <http://www.bpa.gov/corporate/kc/home/index.cfm>.
31. Wilkinson, supra n. 26, at 193-199.
32. As more settlers arrived, they began to farm, mine, and log the

land. These activities diverted water and covered river beds with silt which harmed spawning grounds. "During the last part of the nineteenth century and well into the 1930s, salmon habitat was assaulted by uncountable numbers of unrelated actions." Wilkinson, supra n. 26, at 192. General reason for destruction were (1) destruction of spawning grounds (whole elimination of spawning grounds by grazing, logging (clear-cut), and mining), (2) water pollution (all deposited silt and sometimes chemicals into the waters by logging, ranching, mining, and farming), (3) decrease of water flow (miners, urban areas, and particularly irrigations (it used 90 percent of Northwest water) were allowed to divert from the streams with no limitation), and (4) destruction of a river itself.

33. Lichatowich, supra n. 12, at 57-60.
34. Id., at 60-66.
35. Id., at 66-71.
36. Id., at 71-76.
37. Id., at 54-57.
38. Washington Territory introduced gear restriction in 1871 and began regulating the duration of the fishing season in 1877. Oregon followed those Washington's ways. Wilkinson, supra n. 26, at 190. In 1871, Congress created the United States Commission of Fish and Fisheries to research and improve food resources. Joint Resolution for the Protection and Preservation of the Food Fishes of the Coast of the United States, Resolutions No. 22, 16 Stat. 593 (1871). The first hatchery in the United States was the Klieg Pound Brook Hatchery established in 1871 on the Penobscot River, Maine.
39. The Clackamas Fish Hatchery "was built by the Oregon and Washington Fish Propagating Company and operated for four years. Personnel of the United States Commission of Fish and Fisheries took the fall Chinook salmon eggs, and as soon as the fry were hatched, they released them back into the river. This operation was discontinued in 1880." Barbara Kemmerich Hal-

liday, *Personal Recollection of the Clackamas Fish Hatchery*, <http://www.usgennet.org/alhnorus/ahorclak/ClackamasHatchery.htm>.

40. The Act authorized the Secretary of Commerce to establish salmon-cultural stations in the Columbia River Basin, to conduct investigations, to install devices for the improvement of feeding and spawning condition for the protection of migratory fish from irrigation projects, and to perform all other activities necessary for the conservation of fish in the Columbia River Basin. An Act to provide for the conservation of the fishery resources of the Columbia River, establishment, operation, and maintenance of one or more stations in Oregon, Washington, and Idaho, and for the conduct of necessary investigation, surveys, stream improvements, and stocking operation for these purposes, Pub. L. No. 502, Chap. 193, 52 Stat. 345 (1938).
41. Professor Wilkinson pointed out the problem of disturbance of the original ecosystem by using eggs carried from Canada or some other places and stock the rivers with such non-original young fish. Wilkinson, supra n. 26, at 191, 212, 217-218.
42. Robert Savannah, *US FWS Line Art: Pacific Salmon, (Oncorhynchus spp.)* <http://species.fws.gov/bio_salm.html>.
43. Washington Department of Fish and Wildlife, *Wild Salmon - Our Precious Natural Resource, in Salmon Facts: An Informational Guide to Our State's Natural Treasure* <http://www.wa.gov/wdfw/outreach/fishing/salmon.htm>.
44. (a) The Sacrament River winter-run Chinook salmon was added to the list of endangered and threatened wildlife for 240 days (emergency listing) by the Fish and Wildlife Service on April 6, 1990 (55 Fed. Reg. 12831, 12831-12832), final listed as threatened species on November 30, 1990 (55 Fed. Reg. 49623), and final reclassified from threatened to endangered status on March 13, 1994 (59 Fed. Reg. 13836); (b) The Snake River Sockeye salmon was listed as an endangered species by the Fish and Wildlife Service on January 3, 1992 (57 Fed. Reg. 212, 212-213); (c) The

Snake River spring/summer Chinook salmon and Snake River fall Chinook salmon were final listed as threatened species by the Fish and Wildlife Service on September 23, 1993 (58 Fed. Reg. 49880), and emergency reclassified from threatened to endangered status on November 2, 1994 (59 Fed. Reg. 54840, 54840-54841); (d) The Central California Coast Coho salmon was added to the list of threatened species by the Fish and Wildlife Service on November 20, 1996 (61 Fed. Reg. 59028, 59028-59029); (e) The Southern Oregon/ Northern California Coast evolutionarily significant unit of Coho salmon was added to the list of threatened species by the Fish and Wildlife Service on June 18, 1997 (62 Fed. Reg. 33038, 33038-33039); (f) The nine evolutionarily significant units of salmon, Chinook salmon, Chum salmon, Sockeye salmon, and Steelhead were added to the list of threatened and endangered species by the Fish and Wildlife Service on August 2, 1999 (64 Fed. Reg. 41835, 41835-41839). They are the Puget Sound Chinook salmon evolutionarily significant unit in Washington, the Lower Columbia River Chinook salmon evolutionarily significant unit in Washington and Oregon, the Upper Willamette spring-run Chinook salmon evolutionarily significant unit in Oregon, the Upper Columbia River spring-run Chinook salmon evolutionarily significant unit in Washington, the Hood Canal summer-run Chum salmon evolutionarily significant unit in Washington, the Columbia River Chum salmon evolutionarily significant unit in Washington and Oregon, the Ozette Lake Sockeye salmon evolutionarily significant unit in Washington, the Middle Columbia River Steelhead evolutionarily significant unit in Washington and Oregon, and the Upper Willamette River Steelhead evolutionarily significant unit in Oregon; (g) The two Chinook evolutionarily significant units in California were added to the list of threatened species by the Fish and Wildlife Service on December 29, 1999 (64 Fed. Reg. 72960, 72960-72961). They are the Central Valley spring-run evolutionarily significant Unit and the California Coastal evolutionarily significant unit of the west

coast Chinook salmon.

45. There are some other kinds of salmon being considered for listing, including the Columbia River (Washington) Chinook and Oregon Coast Coho salmon. Savannah, supra n. 42. Idaho's Snake River Coho and Oregon's Wallowa River Sockeye, as well as 104 other wild stocks, are extinct. Many other salmon stocks are on brink of extinction. In 1991, only four Sockeye returned to spawn in Idaho's Redfish Lake. Once a wild run is lost, it is gone forever — the transplanting of non-native stocks is rarely successful. American Rivers, *Pacific Salmon*, in *General Background Information on Pacific Salmon* <http://americanrivers.org/fishwildlife/pacificsalmon.htm>. Furthermore, Atlantic Salmon was designated as endangered on November 17, 2000, in the United States M.E. Gulf of Maine Atlantic Salmon Distinct Population Segment, which includes all naturally reproducing wild populations and those river-specific hatchery populations of Atlantic Salmon having historical, river-specific characteristics found north of and including tributaries of lower Kennebec River to, but not including, the mouth of the Saint Croix River at the United States-Canada border. To date, these populations are found in the Dennys, East Machias, Machas, Pleasant, Narraguagus, Sheepscot, and Ducktrap Rivers and in Cove Brook, Maine. 65 Fed. Reg. 69459, 69459-69483 (Nov. 17, 2000).
46. In 2002, a large-scare wooden device for salmon fishing of four thousand years before was excavated in the city of Ishikari, the next town of Sapporo in Hokkaido Island. A wooden club to strike salmon heads was also found at the same place. It is supposed to be the oldest wooden club to strike salmon in the world. The City of Ishikari, *The Natural History of Ishikari* <http://www.city.ishikari.hokkaido.jp/hakubutushi/index.htm>.
47. For more information about Ainu people's traditional way of life, see Morihiro Ichikawa, *Understanding the Fishing Rights of the Ainu of Japan: Lessons Learned from American Indian Law, the Japanese Constitution, and International Law*, 12 Colo. J. Intl.

Envtl. L. & Policy 245, 245-247 (Summer 2001).

48. The Tanekawa system started about in the middle 1700s. The first trial of this system was made at the Miomote River in Nigata Prefecture. This system was widely accepted in Hokkaido Island and Tohoku area in those days. Sato, supra n. 18, at 22.
49. The Amur River is a borderline between China and Russia. By 1892, the Amur River became the center of an important foreign fishing ground for Japanese fishermen. They made salted salmon there. Sato, supra n. 18, at 138-139.
50. The Kamchatka Peninsula is located in Russia. A fishing treaty was concluded in 1907 between Russia and Japan under the Portsmouth Treaty after the Russo-Japanese War (1904-05). The treaty gave Japan broad fishing rights, and the Japanese fishing industry in the Kamchatka Peninsula developed quickly. Many salmon cans were produced to export to the Great Britain after the canning technique was introduced in 1910 into Japanese fishing industry in Russia. At that time, more than twenty thousand Japanese fishermen were working in Russia and seventy million to one hundred million salmon were canned. Sato, supra n. 18, at 140-141.
51. The full-scale fishing industry of Japanese fishermen started in 1907 in Kurile Islands. Its prime was about during 1939 to 1940. It is said there were nineteen thousand of Japanese fishermen and they caught more than one hundred and thirty million salmon. Most of Sockeye and Coho were canned and exported to the Great Britain and Australia. And most of Chum and trout were salted and shipped to Japan and China. Sato, supra n. 18, at 141.
52. About fifty to fifty-five ships constituted a feet of ship of the mother ship stile salmon fishing. It included 3,000 to 5,000 tons mother ship with canning and salting facilities, 1,500 tons assistant mother ships with refrigerator facility, conveyance ships, tankers, and other independent fishing boats. This style of fishing has developed rapidly from 1933 and its prime was during

1937 to 1941. It is said that about ten to eleven million salmon were caught per year. Sato, supra n. 18, at 142-143.

53. In 1891, a railroad was opened between Aomori Prefecture and Ueno (Tokyo) and the salmon shipment increased dramatically. Sato, supra n. 18, at 144.
54. The Deep-sea Fishery Encouragement Act of 1897 (Enyo Gyogyo Shoreiho) was amended in 1905 and 1909. Sato, supra n. 18, at 143.
55. Sato, supra n. 18, at 143. See also its note n. 50.
56. The treaty comprises eight provisions. The annex of the treaty has strict regulation of salmon, herrings, and crabs fishing. The limitation of salmon catches applied to Japan started with fifty-five thousand, then it declined into forty thousand in 1962 and thirty thousand in 1968. Sato, supra n. 18, at 148.
57. Russia declared that it would adopt the two hundred nautical miles system in December 1976. In February 1977, the United States notified that it would destroy the International Treaty of 1951 regarding to the open sea fishery in the North Pacific between Canada, Japan, and the United States. The United States established the two hundred nautical miles system in March. Sato, supra n. 18, at 148-149.
58. A series of Energy Crises made Japanese salmon fishery industry in financial difficulties. In the high growth era of Japanese economy, people began to like high-class fishes such as tuna. The imports of seafood also grew up. Sato, supra n. 18, at 151, 156-160.
59. The Sayamaike Dam in Osaka Prefecture is the oldest irrigation dam in Japan. It is said to be built in 616. In 2000, it was reconstructed into a modern one. As to the historical development of Japanese dam, see generally Takemichi Hatakeyama, *Shizenhogoho Kogi (A Lecture on Nature Preservation Law),* 133-134 (Hokkaido University Press 2002).
60. The Sakuma Dam is a hydroelectric power dam located in Shizuoka and Aichi Prefectures. It was completed in October

1956. The Sakura Dam was one of the big national projects to restrict the nation in its ruin time after the World War II.

61. Hatakeyama, supra n. 59, at 134.
62. Id., at 135-137.
63. The earliest accurate record to confirm the recursive character of salmon in Japan is found in one of the oldest encyclopedia, the Wakan Sansai Zue (1712). It is a beautiful encyclopedia written in the Edo period (1603-1867) edited by Ryoan Terashima.
64. Akekiyo Karasawa learned salmon reproduction technique from Dr. Living Stone at the Cold Springs Trout Hatchery (Charlestown, New Hampshire) from October 25 to 31, 1876, when he was sent to a world fair held in Philadelphia as an administrative official of Japanese government. Receiving a report on the salmon reproduction tecnique, the Minister of the Interior Okubo Toshimichi has established the Fisheries Agency in the Department of the Interior and appointed Akekiyo for the first chief of it. Sato, supra n. 18, at 63-68.
65. In late April in 1878, he stocked the Naka River with 12 thousand salmon and Tama River with 2.5 thousand salmon. Next year, some hatching farms were built along the Ishikari River (Hokkaido Island), Miomote River (Nigata Prefecture), and Mogami River (Yamagata Prefecture), too.
66. Although Japan had enough amounts of salmon catch in those days, it switched the way of multiplication from supporting the natural spawning system (Tanekawa system) to the artificial one. There are several reasons for it. The Japanese government was eager for new technique from Europe and the United States. The traditional idea of Japanese people as an agricultural people (sow seed, grow it, then harvest it) matched well with the idea of the artificial hatching. Kaeriyama, supra n. 18, at 96.
67. Sato, supra n. 18, at 69.
68. It moved from twenty or thirty million catches in the 1980s to over forty million in the 1990s. Kaeriyama, supra n. 18, at 100.
69. Kaeriyama, supra n. 18, at 108.

70. There must be some reasons for the suspension of designation. First, we do not know the present situation of wild salmon although we are very devoted to artificial incubation. Investigations tend to mix up wild and hatchery salmon. In many cases the investigation does not show exact distinctions between wild and hatchery salmon. Second, the construction industry, politicians, and administrative officials are closely related to each other. Even if a certain kind of salmon is in danger, it is hardly possible that administrative office designates it as a threatened or endangered species because it will regulate the construction industrial activities.
71. Kaeriyama, supra n. 18, at 97-98, 101, 104-108.