Panhandle Region
Annual Fisheries Report

2008 Activities and Accomplishments

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Greetings… *and welcome to the first annual Panhandle Fisheries Newsletter. The intent is to provide a brief summary of the fisheries research and management activities to help folks better understand our fishery resources and know what IDFG is doing to manage them. We hope you'll agree that 2008 was a productive and interesting year for the fisheries programs. We continued to make progress in the effort to control the lake trout population in Pend Oreille through large-scale netting and angler rewards; we conducted fish population surveys on dozens of alpine and lowland lakes to help optimize our stocking rates; we monitored trout populations in the St. Joe and Coeur d'Alene rivers to evaluate the effectiveness of the special regulations; we assessed kokanee populations in Pend Oreille, Coeur d'Alene and Spirit lakes, and we continued efforts to recover the Kootenai River ecosystem.*

This newsletter will be posted on the IDFG website http://fishandgame.idaho.gov/cms/about/offices/panhandle/. If you find it interesting, tell your friends and fishing partners and pass it along. We can most effectively serve anglers when they stay informed and involved. If you have questions or want to share your thoughts, please give us a call. If you'd like to be included on an e-mail distribution list for periodic summaries and particularly interesting (in our opinion) information, please send a request to jfredericks@idfg.idaho.gov and we'll get you added.

Fisheries Programs in the Panhandle

The IDFG "fisheries" program in the Panhandle actually has three components: management, research, and hatcheries. The management staff deals most directly with anglers, regulations, general population assessment, as well as program direction and policy. The management staff is primarily funded by hunting/fishing licenses, Federal Aid in Sport Fish Restoration funds, and Avista mitigation.

The research program in the Panhandle focus on population or area-specific projects. The Pend Oreille Research Project is focused on kokanee population recovery and the world famous Gerrard rainbow and bull trout fisheries the kokanee supported. The Kootenai River Research Project is investigating factors that limit the endangered Kootenai River white sturgeon, as well as the burbot (ling) and trout populations. All of these fish once provided extremely popular and important sport fisheries in Boundary County. The two research programs in the region are both funded by Bonneville Power Administration for mitigation of the federal hydropower system.

Finally, the hatchery system in the Panhandle consists of the Cabinet Gorge Hatchery, which primarily raises kokanee for Pend Oreille Lake, and two distribution hatcheries (Sandpoint and Mullan). Most fish stocked in area lakes come from large IDFG hatcheries in southern Idaho, where the cost of raising fish is far cheaper. The distribution hatcheries serve as holding facilities where fish can be delivered and then redistributed throughout the stocking season. Each year the hatcheries stock more than 160,000 "catchable" (9-11 inches) rainbow trout, 475,000 fingerling rainbow and cutthroat trout, and up to 10 million kokanee. We also stock over 50 alpine lakes on an alternate year basis with rainbow, cutthroat, grayling, and golden trout. Finally, we stock channel catfish and tiger muskies in area lakes to provide diversity and unique angling opportunities.

Although these three sections are distinct, we work closely together and share common objectives. Equally as important, we work with and rely heavily on IDFG officers, as well as wildlife, communication, and administrative staff. Finally, we accomplish very little without our partners in other state and federal agencies as well as tribal programs, nonprofit organizations, angling clubs, and our many volunteers. The accomplishments described in this report are the products of a very broad team effort that stretches well beyond the core staff.

Pend Oreille Fishery Recovery

As most anglers are now well aware, the populations of Gerrard rainbow and bull trout that made Pend Oreille a world-famous fishery are dependent on an abundant prey-base of kokanee. Unfortunately, an increasing population of lake trout has lead to an over-abundance of predators and low kokanee survival. In essence, the predator:prey ratio is out of balance.

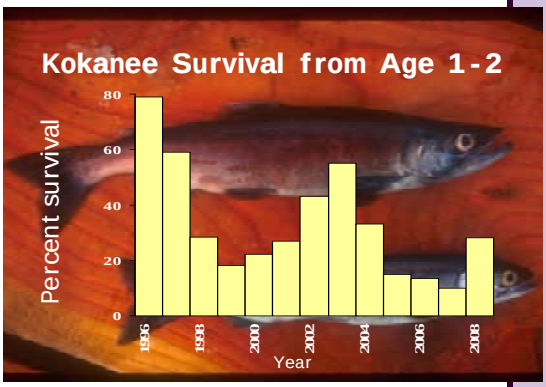
The predator problem was first identified in 2000. Since then, fishery biologists and anglers have generally come to agree that restoring the rainbow and bull trout fishery will require a significant and immediate reduction in the number of predators, combined with long-term suppression of the lake trout population. Since 2006 an Angler Incentive Program (AIP) has encouraged anglers to target rainbow and lake trout by paying a reward. The effort was significantly enhanced with the implementation of commercial netting equipment. The contracted fishermen brought specialized equipment and decades of experience fishing for lake trout in Lake Michigan. The netters use short-set gillnets (to minimize injury to non-target fish) and deepwater trap nets to collect lake trout. To insure the public gets the maximum benefit from the netting program, all lake trout removed are processed for delivery to area food banks. Anglers are asked to target rainbows for the short term, until kokanee recover to the point where they can once again support a trophy rainbow trout fishery.

In many ways, 2008 was the most encouraging year we've seen to date. Anglers removed just over 13,000 lake trout and nearly 4,700 rainbow trout. The commercial netters removed an additional 11,761 lake trout. Between the AIP and the netters, nearly 25,000 lake trout were harvested from the lake in 2008, bringing the total since the effort began in 2006 up to 63,597! The kokanee population showed some very promising signs of recovery (see below). So how many are still left and how long will the program need to continue? Though we can't yet provide a definitive answer, the 2008 results provide some very important progress markers. The adult lake trout (spawning size fish in excess of 24 inches) continues to be harvested at an unsustainable level. Based on a random sample of acoustic tagged fish (see following page) exploitation of spawners by the netting operation was around 65% in September and October alone! We expect this level of harvest on spawning lake trout to result in very low levels of reproduction and ultimately the collapse of the lake trout population allowing kokanee the chance to recover and once again provide the foundation for healthy rainbow and bull trout populations.

Unfortunately, the netting program has confirmed an abundance of two to five year-old lake trout in the population. These young fish (generally 6 to 14 inches) are just becoming vulnerable to gillnets. Most fish are not yet vulnerable to angling until four to five years of age, or 14-16 inches. It is difficult to know how many are still in the lake, but it is clear that the intensive gillnetting effort will need to continue for at least three more years in order to remove these young fish as they enter the population. In essence, the lake trout suppression effort is not unlike turning off a hose. Even though anglers and the netters appear to be well on the way to shutting off the spigot (over-exploiting spawners and shutting off reproduction), there will still be water in the hose (juvenile lake trout entering the population). Efforts targeting the juvenile lake trout in the coming years amount to draining the hose.

Kokanee Population Showing Positive Signs

The IDFG Fish Research Crew monitors the status of the kokanee population in Lake Pend Oreille every year. The primary sampling methods are trawling (towing a large net behind a boat to capture kokanee) and hydroacoustics (scientific-grade sonar equipment used to count fish). In combination, these techniques provide us with information to estimate kokanee abundance, survival rates, age structure, biomass, and other population status indicators. In 2008, we saw that kokanee abundance remained near historic lows that are well below levels necessary to provide a sport fishery. However, positive signs that conditions are improving for kokanee were seen for the first time in several years. For instance, estimated abundance of mature (ages 3 and 4) kokanee increased to 25,000 fish from an all-time low of 10,000 fish in 2007. More encouraging was the increased survival rate from age-1 to age-2, which was 28% in 2008 compared to 10% in 2007 (see figure below). Survival of kokanee at this stage of their life-cycle provides an important indicator of predation levels. While a survival rate of 28% is below our goal (50-80%), it suggests that kokanee are suffering less predation. Similarly, biomass (total pounds of kokanee) increased for the first time since 2003. This tells us that the kokanee population was able to produce more than it lost to predation over the past year, instead of the recent trend where predation has driven kokanee abundance and biomass lower and lower each year. Egg collection from kokanee at Granite Creek provided 647,000 eggs for hatchery operations, a slight increase from 486,000 in 2007. While hatchery returns to Granite Creek were similar to 2007, greater increases were observed for wild shoreline spawners. The combined information gathered in 2008 showed improvements in kokanee status for the first time in several years. It is still too early to expect big improvements in the kokanee population as a result of predator removal efforts, but we are encouraged by what we saw in 2008. Over the next few years we hope to see continued improvements.

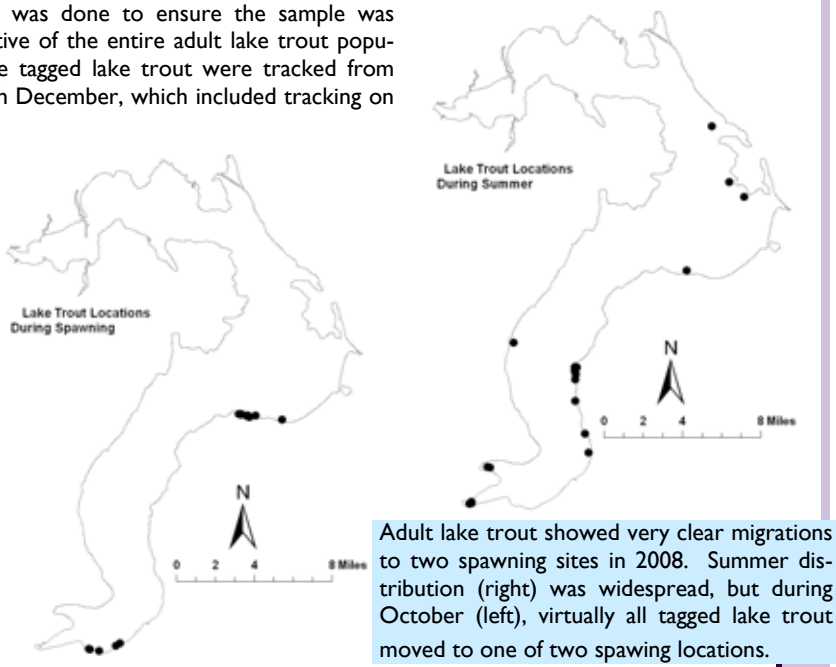


Pend Oreille Fishery Recovery

Acoustic Tags Help Netters Target Spawning Lake Trout

To help steer the efforts of the commercial netting crew, particularly during the spawning season, the IDFG Fishery Research Crew surgically implanted acoustic or "sonic" tags in 33 mature lake trout. Fish were captured during the spring from throughout the lake. This was done to ensure the sample was representative of the entire adult lake trout population. The tagged lake trout were tracked from July through December, which included tracking on at least a weekly basis when commercial netters were working.

The results were very interesting – and helpful. In both 2007 and 2008, we observed very defined movement patterns of lake trout to two spawning areas in the entire lake. Nearly all of the tagged fish migrated to either Windy Point or Echo Bay during September and October. At each spawning area, lake trout occupied areas along the shoreline in depths of 100-120 feet. The concentrated distribution of lake trout at these sites allowed commercial netters to more effectively capture and remove them with gill nets. In fact, netters recaptured 15 of the 23 lake trout that were carrying acoustic tags during the spawning season. Since these tagged fish represented the entire population of mature lake trout, we estimated that 65% of the mature lake trout in the lake were removed during the fall of 2008 from netting alone.

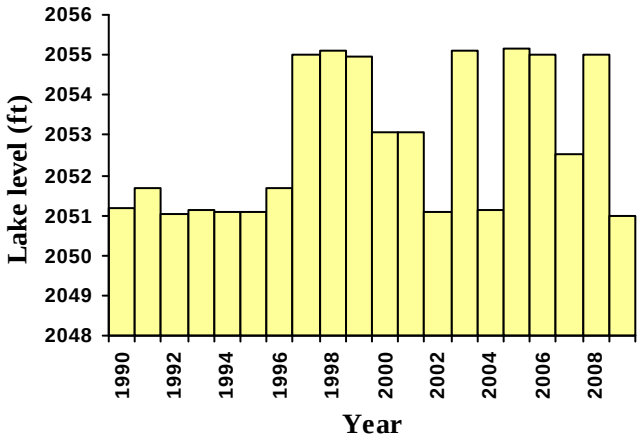


Adult lake trout showed very clear migrations to two spawning sites in 2008. Summer distribution (right) was widespread, but during October (left), virtually all tagged lake trout moved to one of two spawing locations.

Winter Lake Level Benefits Kokanee Spawning Habitat

Every year the water level in Lake Pend Oreille is dropped for the winter months. Several factors, including the status of kokanee, gravel conditions, precipitation, and chum salmon numbers below Bonneville Dam, determine whether the surface elevation of the lake will be set at 2,055 feet or 2,051 feet. Coordination meetings last fall resulted in a decision to set the lake level at 2,051 feet this winter. In most years, kokanee benefit from the higher lake level because more suitable lakeshore gravel is submerged and available for spawning. However, drawing the lake down every few years acts to redistribute spawning gravels and clean them of fine sediments. This process improves the quality of spawning habitat for kokanee. We expect the current winter lake level to benefit kokanee spawning conditions over the next few years.

Drawing the lake down every few years acts to redistribute spawning gravels and clean them of fine sediments



Coeur d'Alene Lake

A Delicate Balance of Predator and Prey

Idaho Department of Fish and Game manages Coeur d'Alene Lake to provide a yield fishery for kokanee. This popuplar "low tech" fishery dates back to the 1950's and historically provided a harvest of up to a half-million fish. In 1982, Chinook salmon were introduced to take advantage of the abundant kokanee and to provide more of a trophy fishery. While the program has generally worked for over 25 years, the balance has been, at times precarious. Too much predation by Chinook can leave too few kokanee to support a fishery. On the other hand, too few Chinook makes for a poor Chinook fishery. Flood events further complicate the balance when large numbers of kokanee and/or Chinook leave the lake in spring runoff. For the past 10 years anglers and biologists have struggled with an imbalance in the kokanee-Chinook fishery that originated with the floods of 1996 and 1997. The good news is that by decreasing Chinook numbers and restricting kokanee harvest (and fortunately not having any major floods), the populations seem to be coming back into balance.

Idaho Fish and Game's trawler that was used on Coeur d'Alene Lake to monitor kokanee abundance.

Kokanee Population on the Rise

Idaho Department of Fish and Game monitors the abundance of kokanee each year to determine the best approach to managing the species. This past July and August we trawled the lake and ran a hydroacoustic survey to monitor kokanee densities. Trawling involves pulling a 8 ft wide, by 10 ft tall, by 40 ft long net through the water at depths to 90 ft. The hydroacoustic survey uses a depth sounder that pings the fish with a sound wave and listens for echo. Both methods give estimates of the number and sizes of fish in lake. Each method has its strengths and weaknesses, but by using both methods together we get a pretty good picture of what is happening in the lake.

The results were encouraging. Kokanee fry abundance was high; in excess of 3 million fish. This should be enough fry to get the next generation of kokanee off to a good start. It also shows that this past spring's high run-off did not overly impact the number of fry in the lake, and that reproduction last fall was very successful. We were also happy to see an abundance of kokanee in the 5 to 8 inch range. Populations of one and two-year old kokanee were the highest they've been in over ten years. We estimated 3.6 million age-1 kokanee, which is about a threefold increase over the past five years. More encouraging we estimated 1.7 million age-2 kokanee, which is nearly a ten-fold increase over the five year average.

The juvenile kokanee population is the highest it's been since before the floods of the 1996 and 1997

The increase in juveniles reflects decreased Chinook predation. Kokanee survival from age-1 to age-3 has been less than 3% in recent years, leaving very few adults to spawn. We expected few adults based on the 2007 estimate of age-2 fish. Indeed, adult kokanee (age-3) were the second lowest on record at 30,000 fish, and low enough that all of these adults were needed for spawning in order to get the next generation started. For this reason the fishery was closed in September. Given the abundance of age-2 fish, we are hopeful that the late summer closures implemented during the past three years will no longer be necessary. We expect good numbers of age-3 kokanee and a good fishery next summer if survival remains good through this winter.

Chinook Fishery Reflects Low Population

Since 1982 the Chinook population has been maintained by hatchery produced fingerlings as well as allowing some of the fish to spawn in the Coeur d'Alene and St. Joe rivers. With the low numbers of kokanee in recent years, we've intentionally managed the Chinook fishery to decrease the population and lower kokanee predation. Anglers have been allowed to keep six Chinook instead of two. Additionally, we have not stocked Chinook for the past two years. Finally, we've continued to limit the number of redds (spawning nests) in the rivers, as we have since the early 1990's. This year, we counted 109 redds in the Coeur d'Alene and St. Joe Rivers. Nine of these redds were disrupted, leaving 100 undisturbed for natural production.

The efforts to reduce Chinook predation on kokanee in recent years have worked. Anglers have reported fewer Chinook in the fishery, and fewer fish weighed in during the annual Big One Derby than ever before. Although no one *likes* to see poor catch rates and small fish, the reality is that the Chinook fishery cannot be rebuilt until the kokanee population has recovered. Fortunately, we believe we'll be able to resume Chinook stocking and restore some harvest restrictions on Chinook and rebuild a quality fishery in the very near future.

The long-term key to a balanced fishery is a predictable Chinook population. In the coming years, we'll be evaluating our Chinook stocking procedures in an effort to make the hatchery component of the fishery more consistent and reliable. Since 1982, we've used several different stocks of Chinook, stocked at different times of the year, and in different locations. Beginning in 2009, we'll be marking all hatchery Chinook with an adipose finclip, and we'll test June vs. October releases. We'll also be teaming up with the Coeur d'Alene Tribal fisheries program to conduct a year-long creel survey of the lake. This will provide extremely valuable information on catch rates, effort, and harvest of kokanee, Chinook, and the many other important game fish in Coeur d'Alene Lake.

Cutthroat Populations Reflect Management Changes

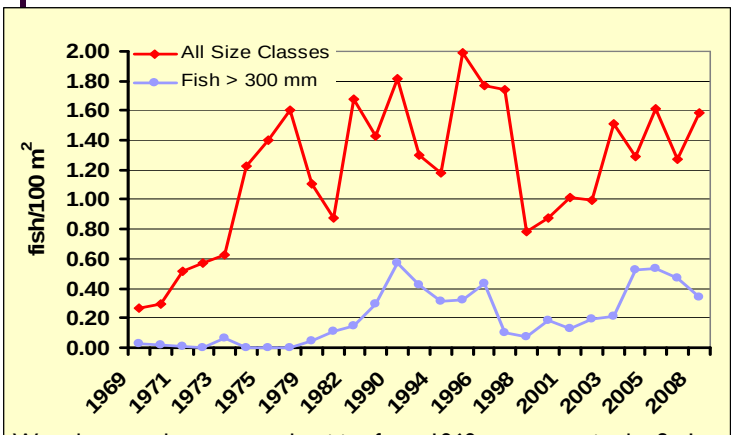
Each year fish biologists count fish by snorkeling in the St. Joe and the North Fork of the Coeur d'Alene rivers in July or August. These estimates give managers a better understanding of how changes in fishing regulations as well as environmental factors affect cutthroat trout densities. Stream transects were established in the St. Joe River in 1969 and in the Coeur d'Alene River in 1973. The majority of the time, abundance surveys are performed by one snorkeler swimming through a pre-measured transect while enumerating fish into specific size categories.

A biologist conducts "snorkel counts" of fish on the N.F. Coeur d'Alene River.

Regulations have evolved over time in response to changing angler demands. Whereas the focus was once on meeting a demand for harvest, anglers have increasingly sought higher catch rates and larger fish. As the population surveys clearly demonstrate, the management of the fishery has worked by increasing overall densities and the number of large fish. The trade-off however, has been harvest. In 2008, catch-and-release fishing for cutthroat was applied to the entire Coeur d'Alene and St. Joe drainages. Although the population can withstand some level of harvest, it would come at the expense of catch-rates and the number of quality-size fish in the population.

St. Joe River

We snorkeled 35 transects in the St. Joe River and counted a total of 1,127 cutthroat trout, 9 rainbow trout and 1,333 mountain whitefish. Cutthroat trout were observed in all transects and were the most abundant trout species. Densities of cutthroat trout (all size classes) at these transects ranged from 0.00 to 6.09 fish/100 m^2 with an overall average of 1.02 fish/100 m^2. About 24% of the cutthroat trout observed were estimated to be ≥ 300 mm in length and their overall density was calculated to be 0.25 fish/100 m^2.

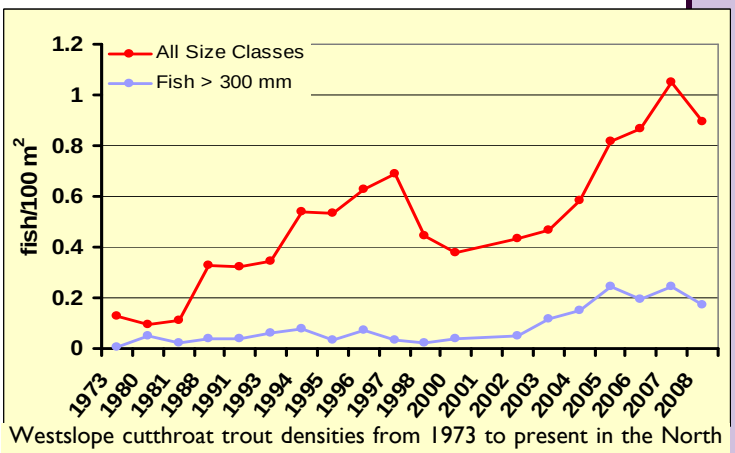


Westslope cutthroat trout densities from 1969 to present in the St. Joe River from the North Fork to Ruby Creek.

Westslope cutthroat trout numbers in the St. Joe River have steadily increased since monitoring began in 1969. Despite flood events, which can significantly reduce cutthroat numbers, the St. Joe population remains strong and able to support a quality fishing experience. More restrictive regulations, mild winters, and habitat improvements have contributed to higher fish densities.

North Fork of the Coeur d'Alene River

We counted a total of 1,413 cutthroat trout, 232 rainbow trout, 5 brook trout and 3,685 mountain whitefish in the North Fork Coeur d'Alene River system. Cutthroat trout were observed in 40 of the 43 transects snorkeled. Densities of cutthroat trout (all size classes) in these transects ranged from 0.00 to 7.86 fish/100 m^2 with an overall average of 0.84 fish/100 m^2. About 21% of the cutthroat trout observed were estimated to be ≥ 300 mm in length and their overall density was calculated to be 0.17 fish/100 m^2. As in the St. Joe, the overall, cutthroat densities in the North Fork Coeur d'Alene River system are on the increase. The last two survey years have been the highest densities of cutthroat recorded since the surveys began in 1973.



Westslope cutthroat trout densities from 1973 to present in the North Fork Coeur d'Alene River.

Despite the high water events experienced in the N.F. Coeur d'Alene River system in the spring of 2008, cutthroat densities have remained strong. Past favorable weather patterns, restrictive fishing regulations, and vast habitat improvements may help explain why this increase occurred. A series of mild winters (1998-2005) and a lack of flood events may have increased survival of the larger adult fish. In fact, aside from last year, the warmest winters on record in Kellogg have occurred over the last several years (1998-2006). Future surveys will indicate whether this increase in the number of large cutthroat trout is a temporary or long-term trend and how average or below average winter temperatures and flood events will effect cutthroat trout densities.

Lowland Lake Surveys

Lake surveys are one of the main tools used to guide fisheries management decisions in the numerous small lakes in Idaho. Lake surveys provide insight to population abundance, size structure, growth, mortality, and recruitment. On average lakes in the Panhandle Region are surveyed every ten years. Most of the survey fieldwork takes place in May and June before emerging aquatic vegetation and warm water temperatures reduces our effectiveness to sample the entire fish community. In 2008, we surveyed Cocolalla, Black, Chase, and Kelso lakes.

Fisheries personnel electrofishing littoral areas during a resent lake survey in North Idaho.

A variety of fish collection gear is used during the surveys, including gillnets, trap nets and electrofishing. Some "gear types" are more effective than others for collecting a particular fish species. Using a variety of gear types reduces bias or selectivity to a certain species or size of fish, thereby providing the best overall picture of a lakes' fish community and size structure.

Typical species composition found in North Idaho lakes includes yellow perch, pumpkinseed, bluegill, largemouth bass, brown bullhead, largescale sucker and tench with a few lakes containing smallmouth bass and northern pike. Although Yellow perch are typically the most abundant species in area lakes, largemouth bass are often among the most significant species by weight (see table).

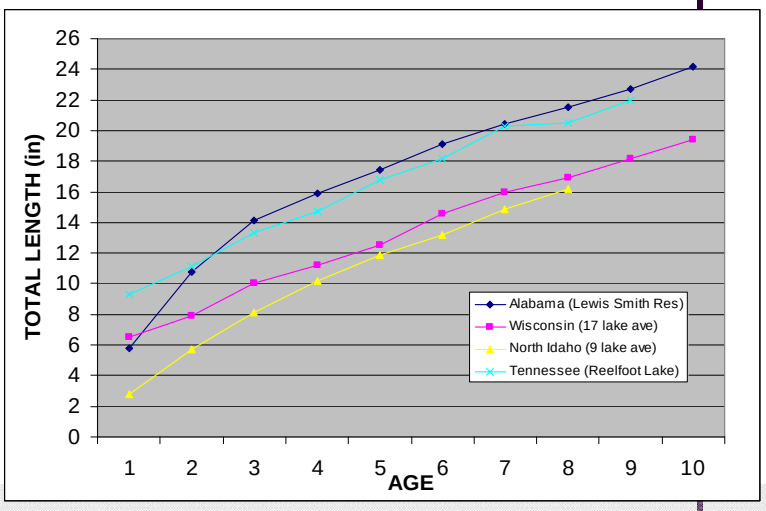


Figure 1. Average largemouth bass growth for northern Idaho compared to other geographical areas.

Largemouth bass are probably the most widely introduced species in North America and one of the most popular fish for Panhandle Region anglers. According to a 2006 Angler Opinion Survey, bass fishing ranks second only to trout in popularity in Idaho. More specifically, in the Panhandle Region, 57% of anglers surveyed said they fish for largemouth bass.

Largemouth bass are a warmwater species that thrives in water temperatures as warm as 90^0-F. Idaho is near their northern limit. Growth rates for largemouth bass in cold, sterile, north Idaho lakes are among the slowest reported in the literature. On average it takes 4-5 years to reach 12 inches. In general it takes 3-4 years longer to grow a 16 inch largemouth bass in north Idaho than in the warmer, more productive waters of southern states (see figure).

In the Panhandle Region, water temperature not only influences growth, but also over-winter survival, particularly for young-of-the-year largemouth bass. Spawning in north Idaho lakes generally takes place in June when water temperatures reach 60-70 degrees. Year-class strength of largemouth bass is determined during the first growing season. Cool weather and a short growing seasons result in small young-of-the-year bass entering winter. Stored energy increases with fish size which increases over-winter survival. Studies have shown that largemouth bass smaller than 2 inches entering winter have a minimal chance of survival in area lakes.

Lake surveys not only allow biologists a means to track fish populations, but also provide us the tools to evaluate various management activities such as fish stocking and fishing regulations all in an effort to make fishing better in northern Idaho.

Lake	Species	Percent of Catch	
		by number	by weight
Cocolalla	Yellow perch	51.2%	7.3%
	Largemouth bass	10.9%	18.4%
	Channel catfish	4.7%	11.1%
	Trout species combined	3.2%	11.2%
	Nongame species combined	15.4%	45.5%
	Other	14.6%	6.5%
Black	Yellow perch	53.1%	23.0%
	Largemouth bass	1.3%	7.6%
	Smallmouth Bass	5.5%	4.4%
	Northern Pike	0.2%	1.9%
	Tench	7.0%	40.9%
	Nongame species combined	19.1%	12.0%
	Other	13.8%	10.2%
Chase	Yellow perch	61.5%	17.7%
	Largemouth bass	19.3%	73.3%
	Pumpkinseed	18.4%	3.5%
	Brown bullhead	0.89%	5.5%
Kelso	Yellow perch	12.8%	15.8%
	Largemouth bass	25.5%	35.6%
	Bluegill	35.8%	18.2%
	Pumpkinseed	21.6%	7.0%
	Tench	1.6%	19.1%
	Other	2.7%	4.3%

Growth and Harvest Rates of Lake Trout in Priest Lake

Priest Lake, north of the town of Priest River, is the area's best producer of lake trout (also known as Mackinaw). Priest Lake lake trout are known for their bright red flesh that comes from a diet that is heavy in opossum (Mysis) shrimp. In 2003 the lake had a harvest of 30,000 lake trout that averaged 22 inches in length. But, many of the lake trout caught at Priest Lake are small. The question we wanted to answer was whether the lake trout were unusually slow growing, or whether harvest was high enough that the lake trout were being "cropped-off" at the smaller sizes. If cropping was a factor, then regulation changes could be proposed to reduce the harvest and allow fish to grow.

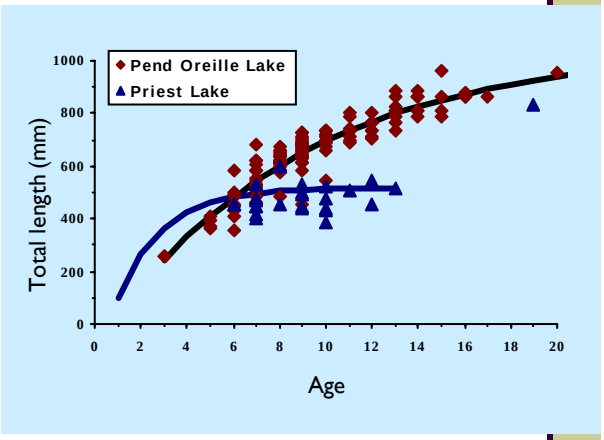
There are a lot of "old growth" lake trout in Priest Lake—they just aren't very big

To answer this question we tagged 64 lake trout with tags that read "Reward $50". The reward should persuade most anglers to turn in their tags. Assuming these tagged fish mixed, survived, and were harvested the same as the general population, then the percent return of these lake trout would be an estimate of the harvest on the entire population.

Secondly we collected 26 lake trout and aged them by sectioning their otolith (ear bone). They were then aged by examining the otolith under a microscope and counting the rings that form each winter.

Only one of our tagged lake trout was caught and had the tag returned to us. This would be a very low exploitation rate of 1.6% (from June to January), and would not indicate lake trout are being "cropped-off" at the smaller sizes. This is consistent with lake trout tagging results from previous years that similarly suggest annual harvest rates are less than 10%.

We also found that lake trout were growing much slower than those in Lake Pend Oreille. A diet of ¾ inch long shrimp, without many forage fish, appears to be holding their growth rate down. The growth rates and low exploitation rates both confirm that the abundance of smaller lake trout in Priest Lake is a result of slow-growing, long-lived fish. In other words, there are plenty of "old growth" lake trout in Priest Lake, but they aren't very big. At less than an inch of growth per year, most fish simply won't ever exceed 30 inches. The low exploitation and slow growth rates indicate that additional harvest protection would not be effective in increasing the size of lake trout.



Mountain Lake Management Provides Diverse Opportunities

There are around 140 mountain lakes in North Idaho. IDFG currently stocks 51 of them to provide fishing opportunities for the public. The remaining 89 lakes are currently not stocked or have not been stocked for many years. Of these, approximately 20 have known brook trout populations. The Department has left many of these lakes fishless to protect native fauna such as frogs and salamanders that utilize these lakes at some point in there life cycle.

The Idaho Panhandle's alpine lakes offer an enhanced fishing experience in scenic landscapes with the opportunity for remote solitude. Our mountain lakes are stocked with species such as westslope cutthroat trout, sterile rainbow trout, golden trout, and arctic grayling. The majority of lakes are stocked with rainbow and/or cutthroat trout fry at approximately 200-500 fish/acre depending on lake elevation.

Growth rates of trout in alpine lakes vary widely depending on many environmental factors such as elevation and aspect. For example, it takes approximately 2.5 years for a cutthroat trout to achieve 10 inches in Sand Lake in the Cabinets, while it takes up to 9 years for a cutthroat to reach the same length in West Fork Lake in the Selkirks. Because of this, IDFG has made significant adjustments to fish stocking numbers taking into consideration these types of variables in attempt to maximize fish growing potential.

IDFG biologists periodically survey the lakes to evaluate fish and amphibian populations, along with angler use. In 2008, biologists sampled 53 lakes with gill nets from June to October. Elevation of lakes ranged from 2,776 to 7,326 feet. Lake size varied from 0.7 to 44 acres and depth ranged from 4 to 95 ft. The majority of lakes sampled contained cutthroat trout, followed by brook and rainbow. In addition to fish sampling, Columbia spotted frogs were recorded in 29 (57%) of the lakes, western toads in 8 (16%), and long-toed salamanders were observed in 6 (12%) of the lakes sampled.

Currently, the Idaho Department of Fish and Game is in the process of developing a comprehensive Alpine Lake Management Plan, which will encompass long term objectives of maximizing fishing opportunities for the public while at the same time maintaining a number of fishless lakes in every major drainage to protect native amphibian and invertebrate fauna. In addition, adjustments to stocking rates will be continuously examined to determine if fish growing potential is being maximized.

Kootenai River Fisheries Restoration

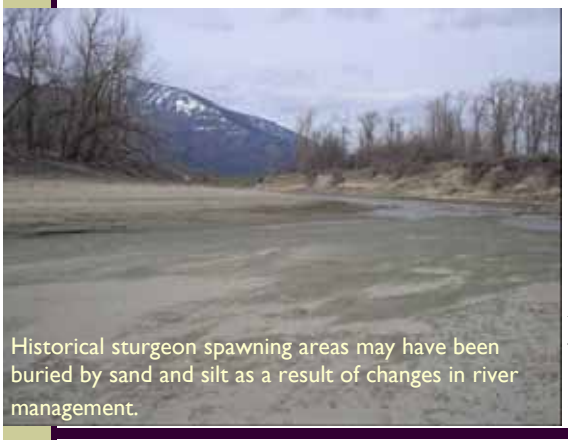
The Kootenai River is home to some of Idaho's most unique game fish populations. In addition to rainbow, cutthroat, bull trout and whitefish, white sturgeon and burbot (ling) once supported popular fisheries. Many changes have taken place in the Kootenai River affecting these fish populations, but the most dramatic was the construction of Libby Dam. Operation of the dam and Koocanusa Reservoir changed the natural flow patterns of the river, with flows now generally being higher in winter and lower in spring. Prior to Libby Dam, flows during runoff averaged almost 75,000 cubic feet per second (CFS). Spring runoff flows now average about 20,000 cfs. The dam also changed the temperature patterns of the river. Whereas the Kootenai River historically froze over nearly every year, water stored in the reservoir and released in the winter is actually warmer, preventing the river from freezing. Finally, the reservoir created a "sink" for the nutrients in the upper Kootenai River, resulting in a river with fewer aquatic plants, insects, and fish below Libby Dam.

The Kootenai River Fisheries Recovery Program is investigating how to mitigate the effects of the dam to restore these important fish populations and the fisheries they once supported. The Kootenai River program is comprised of four components: White Sturgeon Recovery, Nutrient Restoration, Trout Studies, and Burbot Recovery.

Because of the Kootenai River and its fish populations stretch beyond state boundaries, the IDFG works closely with the Kootenai Tribe of Idaho, British Columbia Ministry of Environment, and Montana Fish Wildlife and Parks as well as the US Fish and Wildlife Service, The US Army Corps of Engineers, and the Bonneville Power Administration.

Sand not Suitable for Sturgeon Spawning

The Kootenai River white sturgeon was listed in as an Endangered Species 1994. Since then the US Army Corps of Engineers has modified flows to enhance sturgeon spawning and rearing. Flows of 20,000 to 40,000 CFS have indeed led to annual spawning. IDFG researchers have found over 1,500 eggs since the flows started. Unfortunately, there is very little evidence the eggs survive to hatch. Researchers are trying to understand why. The research suggests that the spawning location of white sturgeon in the Kootenai River is comprised of sand. The problem is that sturgeon eggs are designed to sink and attach to cobble and gravel—not sand.



Historical sturgeon spawning areas may have been buried by sand and silt as a result of changes in river management.

Since 2005, IDFG and USGS researchers have summarized information on physical attributes of the sturgeon egg collection sites such as velocities, depth, flow, and scouring power and to move sediments. The results indicate the management of Libby Dam and Kootenai Lake have combined to significantly change the historical spawning areas. In other words, sturgeon are spawning in an area that was once a cobble bottom reach of river, where they've spawned for generations. With the changes in hydrology, the rocky substrate has been buried by sand.

USGS modeling indicates discharges of 60,000 cfs or more are needed to uncover the coble and gravel spawning locations. In 2006 unusually high runoff forced the release of over 60,000 cfs from Libby Dam. Though the high flows did validate the model and show sand being cleaned from spawning areas, the event required sandbagging for property protection and resulted in significant crop damage. Given the potential damage associated with such high flows, the restoration of suitable sturgeon spawning habitat may require an artificial restoration of coble substrate as opposed to sand flushing flows.

Nutrient Restoration helps Restore Fish Populations

The natural flow and nutrient regimes no longer exist in the Kootenai River. As early as the 1880s, logging and mining changed streams by causing tributary discharge to flash and caused siltation. In 1892, the river was further disturbed by attempts to dike lower reaches for agricultural purposes. From 1953 through the 1970s, water quality was further impacted by the operation of a fertilizer plant on the St. Mary River, British Columbia which increased nutrients to unhealthy levels for approximately a decade. The Kootenai River ecosystem's most damaging disturbance came with the construction of Libby Dam and its resulting reservoir. Koocanusa Reservoir now acts as a nutrient and sediment trap. The reservoir retains approximately 63% of the inflowing phosphorus (P) and 25% of the total nitrogen (N). Consequently, the Idaho portion of the Kootenai is now considered "nutrient poor". Lower nutrients cause a reduction in algae production limiting insect and, in turn, fish production.

Rocks from above (left) and below (right) the nutrient application pipe clearly show the increase in productivity as reflected by algal growth .

BPA is funding the Kootenai Tribe of Idaho, in partnership with the IDFG to add nitrogen and phosphorus to the Kootenai River for up to 5 years. The goal of this project is to enhance native fish populations and river health affected by the construction and operation of Libby Dam. The nutrients are expected to stimulate production in the Kootenai River's depleted food web and reverse downward trends in fish populations such as trout, kokanee, mountain whitefish, burbot, and white sturgeon. Already researchers have found notable increases in aquatic insects, which has translated to more fish and better growth. Continued monitoring and nutrient enhancement in the coming years will further define the benefits to the sport fishery.

Kootenai River Fisheries Restoration

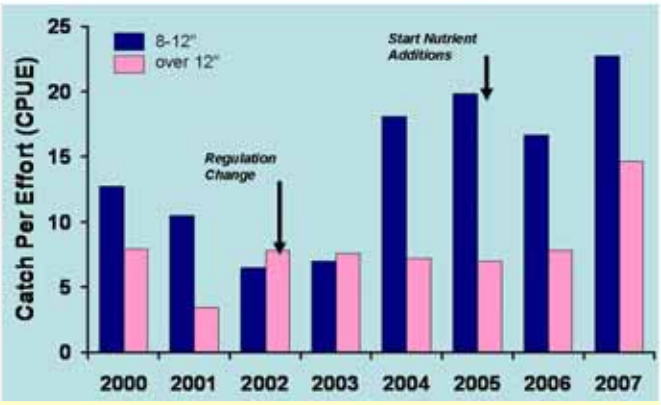
Trout Population Responding to Management Changes

Though rainbow trout are the most popular sport fish in the Idaho reach of the Kootenai River, densities are generally low compared to other rivers of its size. Several factors likely contribute to the low densities, suggesting no single management strategy can be relied on to increase the population. A lack of nutrients, juvenile recruitment, and harvest all likely play a role in limiting the trout population.

Because much of the productivity of the Kootenai River is trapped in Lake Koocanusa, nutrients that do pass through the dam are quickly used by aquatic plants and insects. The progressively diminishing growth rates and densities of trout from Libby Dam to Bonners Ferry reflect the decrease in productivity. A key goal of the nutrient enhancement project is to restore the growth rates and densities of trout to levels to "pre-Libby Dam" levels.

Another limitation to the trout population may be a lack of tributary habitat for spawning and rearing. Rainbow and cutthroat trout rarely spawn in rivers as large as the Kootenai River. Instead, they utilize "nursery streams" that provide more suitable gravels and juvenile fish habitat. The reach of the Kootenai River between Kootenai Falls and Bonners Ferry has few large tributary streams. Researchers have been estimating the amount of juvenile trout production that comes from these streams to evaluate whether enough tributary habitat exists to fully "seed" the Kootenai River.

Finally, harvest rate (exploitation) studies have also been conducted on the Kootenai River in recent years. Annual harvest was estimated at 58 % in 2000, which was high enough to have an effect on the number and size of fish in the population. As a result, a 2-fish daily limit with a 16 inch minimum size rule was implemented January 1, 2002. An annual monitoring program indicated an almost immediate increase in the number of rainbow trout—particularly those less than 12". In the eleven years from 1993 to 2004, rainbow trout densities have increased from about 3 fish to 11 fish per acre.



Abundance of juvenile (8-12") and adult (12"+) trout as indexed by electrofishing catch in the Kootenai River, near Hemlock Bar, since 2000.

Trout densities and growth rates are still low compared to some more well-known trout fisheries, yet changes in habitat and management have resulted in notable improvements. All indications are that nutrient enhancement, recruitment studies, and regulations will continue to make this a more productive trout fishery.

Future of Burbot Population Uncertain

Burbot are a unique fish. Not only are they the only freshwater member of the cod family, but (in Idaho) they are only native in the Kootenai River. Unfortunately, the burbot population, which once supported an annual harvest of thousands of fish during the winter ice fishery is nearly gone. Researchers with IDFG have used radio and sonic telemetry for the past 13 years to monitor movement and behavior of burbot. Interestingly, the burbot population found near Bonners Ferry is migratory, with many individuals traveling to Kootenai Lake. These migrations, as it turns out, are critical.

Libby Dam and the associated changes to river flows and temperatures appear to have affected the migratory patterns. Increased winter water temperatures may delay burbot migration by as much as a month. Furthermore, burbot have exceptionally low swimming endurance—a factor that may further inhibit their ability to migrate during the artificially high winter flows. Unfortunately, telemetry studies confirm that there has been virtually no spawning migration from Kootenai Lake and the lower river into Idaho for several years. Soon after Libby Dam was completed in the mid 70s, the harvest began to dwindle. Though fishing seasons in Idaho and British Columbia were closed, burbot numbers continued to decline. Population estimates by the mid 90s indicated about 650 burbot remained between Kootenay Lake and Bonners Ferry. A similar study in 2004 indicated there were only about 50 fish remaining. Based on winter sampling in 2006-07, researchers suspect there may be as few as 20 fish remaining.

These burbot were raised in a farm pond in the Kootenai Valley as part of an effort to evaluate the potential to supplement the dwindling population.

Is there hope for burbot? A special committee of the Kootenai Valley Resource Initiative (KVRI) believes so. The KVRI is a grassroots effort by the Kootenai Tribe of Idaho and elected officials to take a proactive role in local environmental issues. This committee has recently finished an International Kootenai River Burbot Conservation Strategy that lays out a plan in which all managing agencies do their part to bring burbot back. Measures in the Conservation Strategy include lower winter flows and temperatures. Additional measures include research by The Kootenai Tribe of Idaho and the University of Idaho to raise young burbot from parents genetically similar to those in the Kootenai River. Both agencies are cooperating with IDFG in experiments to raise burbot in outside ponds. This past summer the IDFG was able to raise about 90 fingerling burbot in an outdoor pond. If young burbot can be produced successfully by either method they may eventually be released to help recovery of the native Kootenai River burbot.

Redd Surveys Help Track Bull Trout Populations

Bull trout (historically called Dolly Varden or dollies) are maintaining their place in North Idaho's waters. How do we know? We know because the IDFG and agency partners annually monitor bull trout abundance in standard index streams throughout the Panhandle Region. Unlike many fish monitoring programs abundance isn't monitored by counting fish. Given the migratory nature of bull trout, counting them as we do with some other species would be difficult at best. Instead, bull trout abundance is monitored indirectly by counting bull trout redds that were left behind by spawning fish in many of the regions streams. Redds are cleared depressions found in stream gravels where eggs were deposited and covered, much like a nest. Redds are counted by walking streams and visually identifying these cleaned depressions. In 2008 redd counts were completed in 53 streams in the Lake Pend Oreille, St. Joe River, Kootenai River, and Little North Fork of the Clearwater River drainages.

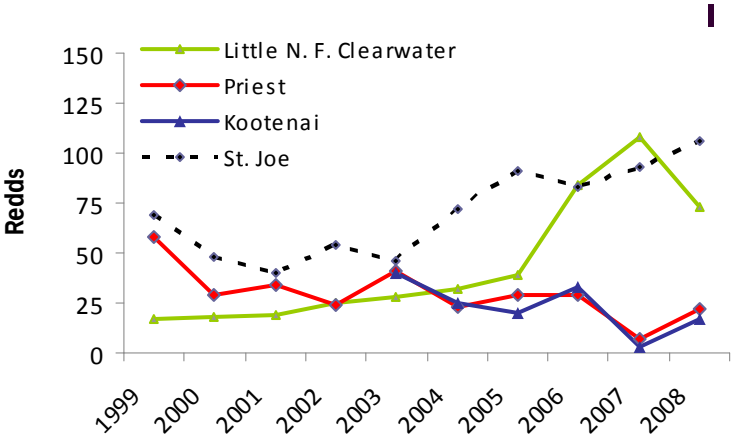
"Redds are cleared depressions found in stream gravels where eggs were deposited and covered, much like a nest"

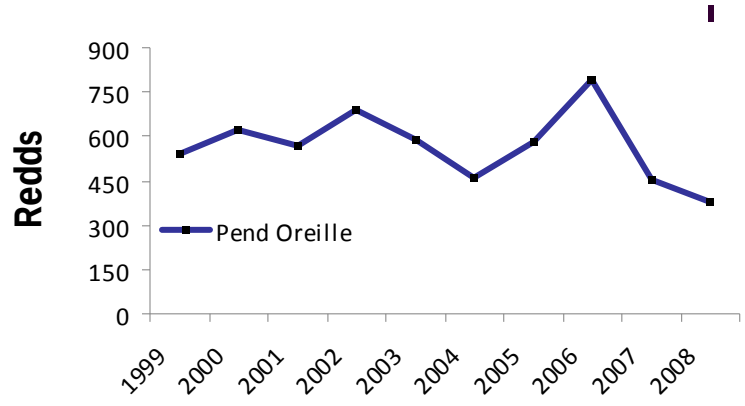
Panhandle regional redd count trends (10 yr average, 1999-2008) indicate bull trout populations have increased in the St. Joe and Little North Fork of the Clearwater drainages (top figure). Counts in the St. Joe drainage in 2008 were the highest we've seen in 10 years. Unfortunately, not all counts revealed positive results. Redd counts in 2008 were below the ten year average in the Priest, Pend Oreille, and Kootenai drainages. Priest River drainage counts have shown a continued decline over the last 10 years. Though down from two years ago, the Lake Pend Oreille counts still reflect the largest and most healthy population of bull trout in the region (bottom figure). Redd counts are quite variable from year to year. For that reason, any individual year may not accurately reflect the population. The long term trends are typically more valued in monitoring population status.

Bull trout across Idaho and the other western states have been listed as "threatened" by the U.S. Fish and Wildlife Service in 1999. At that time populations were considered to be in decline and at risk in many areas where they have historically been found. Since 1998, bull trout have been closed to harvest in Idaho. An objective of IDFG is to restore harvest opportunity where populations can support it, such as in Lake Pend Oreille, where the Idaho state record bull trout (32 pounds) was taken in 1949. This will only be possible when the population is deemed "stable or increasing". Annual redd counts are key to assessing those trends.

The Idaho Fish and Game in cooperation with many other agencies, local groups, businesses, and individuals aren't just monitoring how many bull trout are out there, we're also working hard on projects to help improve numbers of bull trout. Currently, projects are underway that enhance habitat by improving stream conditions, removing barriers that stop bull trout from getting to prime spawning areas, and reducing competition with other non-native fish for food. One notable project underway is the Angler Incentive Program on Lake Pend Oreille, (featured on p. 2-3) aimed at recovering kokanee and reducing competition for food with non-native lake trout.

A bull trout sits over a nest or "redd" during spawning.





Long term (10 Yr) trends in bull trout redd counts on index streams in Pend Oreille (bottom) and other the major drainages of the Idaho Panhandle Region (top).

Spirit Lake Kokanee Population Strong

But as numbers go up, size goes down

Spirit Lake, in Bonner County Idaho, holds a unique distinction among lakes in the Pacific Northwest. Most fishermen do not realize it, but Spirit Lake has been the top producer of kokanee out of 28 lakes in the region on a per acre basis. It is true that larger lakes like Lake Pend Oreille and Coeur d'Alene Lake have historically produced higher numbers of kokanee for the fishermen, but they are much larger systems. Spirit Lake, at 1,477 acres has produced harvests of over 11 pounds of kokanee per acre. In 2008, Idaho Fish and Game examined the kokanee population to see if any changes were needed in the lake's management.

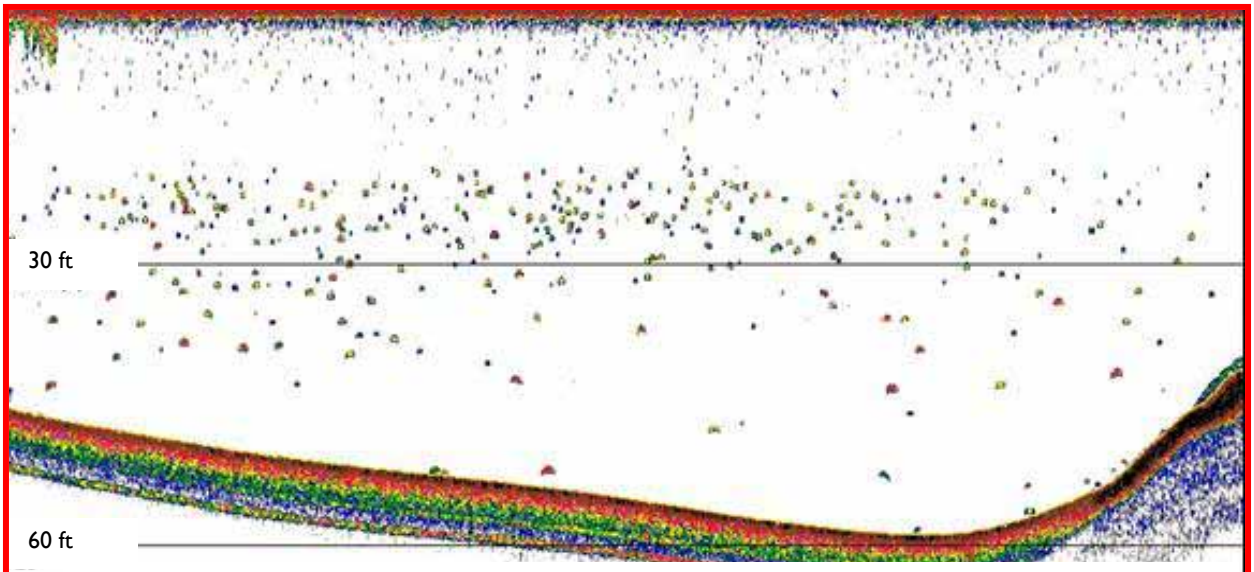
Kokanee were monitored by both trawling and hydroacoustics in 2008. We pay particular attention to the number of fry in the lake since they will be the fishery in 2011, and are the one year class we can increase by stocking more fish. With the high spring runoff this year we worried that many fry may have been irretrievably lost out of the lake's outlet. Our surveys showed that fry were doing well by both of our monitoring methods. We estimated 282,000 fry by trawling and 554,000 fry using echosounding. It is typical for the echosounding estimate to be higher since it is able to look for fish in the bays and shallower waters of the lake. Fry abundance was plenty high enough to fully seed the lake so there was no need this year for additional stocking.

High kokanee densities support a popular ice-fishery on Spirit Lake.

Adult kokanee were also doing quite well. We estimated the lake contained 42 adult kokanee/acre. A "catch-22" of kokanee management is, however, that high densities lead to lower growth rates, and ultimately smaller fish. The challenge in managing kokanee populations is to maintain densities that are not too high, or not too low, but as Goldilocks would say….juuust right. Extensive kokanee work around the west has shown 12-20 adults per acre is optimal for a lake like Spirit. Because we're above this range, the average size of the adults was only 9 ¼ inches long. We generally like to see adult kokanee average 10 inches in the summer.

For its size, Spirit Lake has historically been one of the top producers of kokanee in the North-

Anglers can expect a strong year class of adults in 2009 as well. The two year old kokanee, that will be adults in 2009, are well above average in abundance but again somewhat on the small side at 7 ½ inches in length. They will grow a couple of inches next summer, but most will likely remain under 10 inches in length. Given the problems we've had with kokanee in Coeur d'Alene and Pend Oreille, however, we're happy to have kokanee densities be slightly higher than the target. For the angler it means that finding kokanee should be less of a problem, but sometimes getting these fish to hit and stay on the hook may be a bit tricky. As many kokanee fans know, however, large or small, they are excellent eating, and the little ones fit in a quart jar very nicely.



Echosounding picture of the west end of Spirit Lake in 2008. Dots around the 30 ft depth are kokanee.

Acknowledgements:

We appreciate the partnerships and support from the many individuals, organizations and agencies that help us to achieve our mission, including:

IDFG Volunteers
Avista
Bonneville Power Administration
Bureau of Land Management
Rathdrum Parks and Rec.
Lake Coeur d'Alene Anglers Assn.
Lake Pend Oreille Idaho Club
Shoshone Co. Sportsmen Assn.
Bonner Co. Sportsmen Assn.
Kootenai Valley Sportsmen Assn.
North Idaho Flycasters
Priest Lake Sportsmen Assn.
Idaho Dept. of Lands
Idaho Dept. of Water Resources
Dept. of Environmental Quality
U.S. Fish and Wildlife Service
U.S. Forest Service
Kootenai Tribe of Idaho
Coeur d'Alene Tribe
Kalispel Tribe

Community Involvement

Avery Jr. High Helps with Cutthroat Trout Tagging Study

In October, 2008, IDFG fishery biologists teamed up with the USFS to tag juvenile cutthroat in Eagle Creek, a tributary of the St. Joe River. The tagging study was also used as a teaching aide for the students at Avery Junior High School to show what biologists do to manage and keep track of on the ground programs to maintain wild trout populations.

The students were able to see how biologists use electrofishing equipment to collect the fish from the streams by temporarily stunning them. They then watched as a biologist anesthetized the fish, made and incision, implanted a tag, and sutured the cut.

Avery students watch as a radio tag is surgically implanted into a juvenile cutthroat trout.

The experience was a first hand look for the kids at how technology is applied to fisheries science, helping biologists understand fish movement. A total of 20 trout were implanted with radio transmitters in order to determine if fish were utilizing areas specifically improved for juvenile overwintering.

Weather doesn't Dampen Free Fishing Day Clinics

Okay….maybe it dampened things a little! Despite the cool temps and the drizzle, IDFG staff and volunteers hosted 9 fishing clinics around the region on Free Fishing Day in June.

In all, over 1,100 kids and parents attended the clinics. The clinic at Rathdrum City Park drew over 300 participants alone! Rods, reels, hooks, and bait were provided for anyone who needed equipment, and the lakes and ponds were stocked in advance. Volunteers not only helped untangle lines, bait hooks, and clean fish, they also helped teach kids and their parents basic skills involved with fishing. The annual event is a great opportunity for kids of all ages and experience levels to enjoy a morning of fishing. For those kids and families with little fishing experience our hope is to provide an introduction and the basic knowledge that will lead to many great days of fishing in the future.

Thousands of Pounds of Lake Trout Distributed through Area Food Banks

One thing to consider when using commercial fishing equipment to remove thousands of lake trout from Pend Oreille is what to do with all those fish? As anyone who's ever dined on lake trout knows, properly prepared, it is one of the finest eating fish our lakes have to offer. Fish also can help round out a balanced diet—particularly for people who may have trouble affording protein. There was no question that the fish could be put to good use if we could get them to the right people. Logistically, however, cleaning, icing, and delivering the fish from the net boats to the food banks is no small task. The process also requires close coordination with the food banks to insure they have the capacity for the fish. Thankfully, the IDFG volunteer program has met the challenge. In 2008, we estimate that area food banks processed and distributed over 20,000 pounds of lake trout.

Although the levels of mercury in lake trout from Pend Oreille are sufficiently high to warrant a consumption advisory, when consumed at levels consistent with the advisory, they are a safe, healthy addition to a diet.