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Report to the Ranking Minority Member, Committee on Resources, House of Representatives

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NATIONAL FISH HATCHERIES

Classification of the Distribution of Fish and Fish Eggs Needs Refinement

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GAO

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Resources, Community, and
Economic Development Division

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October 15, 1999

The Honorable George Miller
Ranking Minority Member, Committee on
Resources
House of Representatives

Dear Mr. Miller:

Fish hatcheries operated by the U.S. Fish and Wildlife Service have been part of the nation's network of fish hatcheries for more than 120 years. While state and tribal hatcheries play an important role in supplying fish for commercial and recreational fishing, federal hatcheries have a unique role. This role includes helping to ensure the recovery of species of fish that have been listed as threatened or endangered, restoring native fish stocks to self-sustaining levels, replacing fisheries lost as a result of federal water projects, and supplying fish to Indian tribes and Fish and Wildlife Service lands. The performance of federal hatcheries has been a matter of some controversy, including such issues as their role in and impact on fish recovery and restoration efforts, the health of fish released into streams, and the ability of hatchery-raised fish to survive when released into the wild.

To provide the Congress with information to help evaluate the appropriate role for federal hatcheries, you asked us to develop a baseline assessment of current activities at these facilities, known collectively as the National Fish Hatchery System. As agreed with your office, we focused our review on the following questions:

- What has been the funding level for the National Fish Hatchery System since fiscal year 1992, and what impact has this funding level had on its operations?
- What is the current production level at federal hatcheries; what portion of this production goes for recovery and restoration efforts; and what is the distribution of total hatchery production into federal, state, and other waters?
- What are some of the issues related to the health and disease problems at these hatcheries that pose problems for introducing their fish into the wild?

Results in Brief

Appropriations for operating the National Fish Hatchery System dropped from about $47 million to $40 million, or 15 percent (in constant 1999 dollars), from fiscal years 1992 through 1999, while the Fish and Wildlife Service's overall budget increased during this period. According to hatchery managers and other Fish and Wildlife Service personnel, these funding declines have resulted in unfilled staff positions and a drop in the distribution of fish and fish eggs. About one-fourth of the positions at federal hatcheries are currently unfilled, and 1998 fish distribution was about 19 percent below 1992 levels. Strategies for dealing with the situation have included transferring some federal hatcheries to states, seeking reimbursement for services provided to states and private entities, deferring maintenance, and relying more on volunteers.

In fiscal year 1998, the National Fish Hatchery System distributed about 163 million fish, weighing a total of about 5.7 million pounds, and about 122 million fish eggs. Our review of the Service's records showed that its data overstated the extent to which the distribution from federal hatcheries has gone for restoration or recovery efforts. We found that 40 percent of the fish and 20 percent of the pounds distributed were used to assist in restoration and recovery efforts, not 80 percent of the fish and 56 percent of the pounds as identified by the Service. Moreover, federal hatcheries have assisted in the production of fish for commercial and recreational purposes to a greater extent than the Service indicated. About three-fourths of the fish and half of the fish eggs were distributed to waters under federal jurisdiction, with most of the rest distributed to waters under state jurisdiction.

Service officials and other fish health experts agree that much remains to be learned about the interaction of diseases between wild fish and hatchery-raised fish. They said that hatchery fish were not necessarily less healthy than wild fish but were more likely to show outward symptoms of disease—a tendency they attributed to the greater stress hatchery fish experience from changes in water temperature and quality, high population densities of fish, and handling and transporting. When health and disease problems in hatchery fish were encountered, the hatcheries' responses to the situations varied. Officials said many situations were alleviated with antibiotics or by reducing the stressful conditions, but, in some instances, fish or eggs were destroyed to avoid transmitting a problem to other fish. We also identified instances in which fish that may have been diseased had been released. Hatchery officials said the latter course of action had been taken only with the concurrence of state officials and only in situations where a body of water was closed (such as

a lake with no outlet) or where the specific disease was already known to exist.

Background

Most public and private hatcheries throughout the United States focus on producing fish for the primary purposes of commercial use and recreational fishing, but the 67 hatcheries in the National Fish Hatchery System are supposed to play a different role. According to Service officials, while many of the fish produced by federal hatcheries provide significant commercial and recreational benefits, these benefits are secondary to the primary role of the National System. Since the 1970s, the Service has tried to emphasize the restoration and the recovery of threatened and endangered species, along with the replacement of fisheries lost because of federal water projects. Beginning in 1996, the Service established, with input from public stakeholders, the role and the responsibilities of the federal hatcheries. In 1998, to better align their output with their role and responsibilities, the Service established and defined program categories for use in classifying the distribution of their fish and fish eggs (see table 1).[1] Service officials indicated that they place the highest priority on the first two programs—recovering threatened or endangered species and restoring other native fish stocks to self-sustaining levels.

[1]The Service has not publicly reported on the distribution of fish and fish eggs from the National System since fiscal year 1996. Service officials indicated that a lack of funds and time were the reasons behind the failure to publicly report this information for fiscal years 1997 and 1998.

Table 1: Programs Included in the Activities of Federal Fish Hatcheries

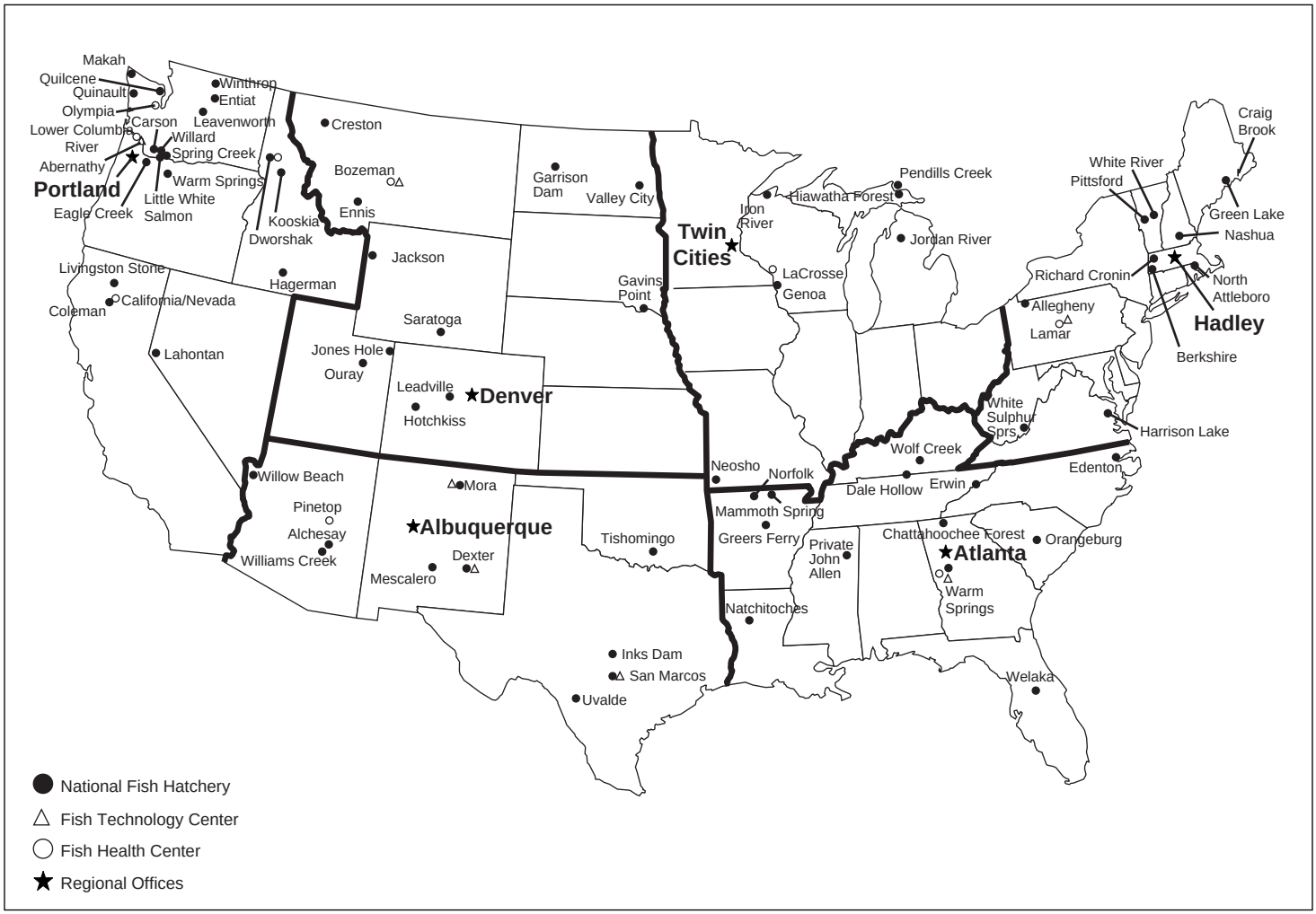
Program	Definition	Example
Recovery	The stocking of native fish to help reestablish self-sustaining populations at levels of abundance and spatial distributions sufficient for delisting	In 1973, the Apache trout was listed as endangered under the Endangered Species Act. The recovery plan called for hatchery propagation. Actions at the Alchesay-Williams Creek National Fish Hatchery in Arizona helped bring recovery to the level that, by 1998, delisting was in sight.
Restoration	The stocking of native fish to help reestablish self-sustaining populations at levels of abundance and spatial distributions well above the threshold for delisting or listing	The paddlefish, one of the largest freshwater fish, has been eliminated from many smaller rivers and streams in the central United States because of habitat loss. The Mammoth Spring National Fish Hatchery in Arkansas, one of several hatcheries involved in paddlefish restoration, raises paddlefish until they are about 12 inches long. They are then stocked into their native habitat.
Mitigation	The stocking of nonnative and native fish to replace or maintain harvest levels lost as a result of federal water projects	Construction of federal dams on the upper White River in Arkansas lowered water temperatures; consequently, native bass, catfish, and sunfish could not survive below the dams. The Norfork National Fish Hatchery in Arkansas produces nonnative trout to stock these colder parts of the river. Because the trout are not able to reproduce and achieve self-sustaining populations in these waters, continued restocking is necessary.
Fish and Wildlife Service and tribal lands	The stocking of nonnative or native fish to enhance harvest, outreach, and educational activities at national wildlife refuges (or harvest on tribal lands), but not with the intent of reestablishing or maintaining self-sustaining populations	In Louisiana, the Natchitoches National Fish Hatchery stocks fish into the waters of the Sabine National Wildlife Refuge to create a recreational fishery. To develop this fishery, the depth of the refuge's waters was raised and they were stocked with fish native to Louisiana.
Partnership management	The stocking of nonnative or native fish to enhance the harvest, but not with the intent of reestablishing or maintaining self-sustaining populations or mitigating the adverse effects of federal water projects	The Leadville National Fish Hatchery stocks trout for recreational fishing on federal lands in Colorado—mainly military reservations, including the Air Force Academy, Peterson Air Force Base, Pueblo Army Depot, and Fort Carson.

Source: GAO's analysis of information provided by the Fish and Wildlife Service.

The 67 hatcheries in the National System are located in 34 states (see fig.1). In addition to these federal hatcheries, the Fish and Wildlife Service

operates nine fish health centers and seven fish technology centers. These centers provide technical support and health screenings.

Figure 1: The Location of the Fish and Wildlife Service's Regional Offices, Fish Hatcheries, Fish Health Centers, and Fish Technology Centers



Source: Prepared by GAO from data provided by the Fish and Wildlife Service.

Disagreements persist about how federal hatcheries should be operated. Matters of controversy include how many federal hatcheries are needed, how they should be funded and operated, and what goals they should try to achieve. In addition, controversies exist about the impact of hatchery-raised fish (such as the transmission of disease and health problems to wild fish stocks), the genetic changes introduced by hatchery-raised fish, and the ability of hatchery-raised fish to survive when released into the wild.

Agency Officials Linked Declining Funds to Staffing Shortages and Drops in Fish Production

During fiscal years 1992 through 1999, funding for federal hatcheries decreased. Service officials said this funding decline had left them unable to fill many positions and unable to perform needed maintenance at federal hatcheries, which in some cases, resulted in threatened or endangered fish being lost. As a result of these decreases in funding, fish and fish egg production also declined during this timeframe. Officials said that they have adopted a variety of strategies to obtain additional funding or stretch operating dollars.

The Level of Appropriations for Federal Hatcheries Has Declined by 15 Percent

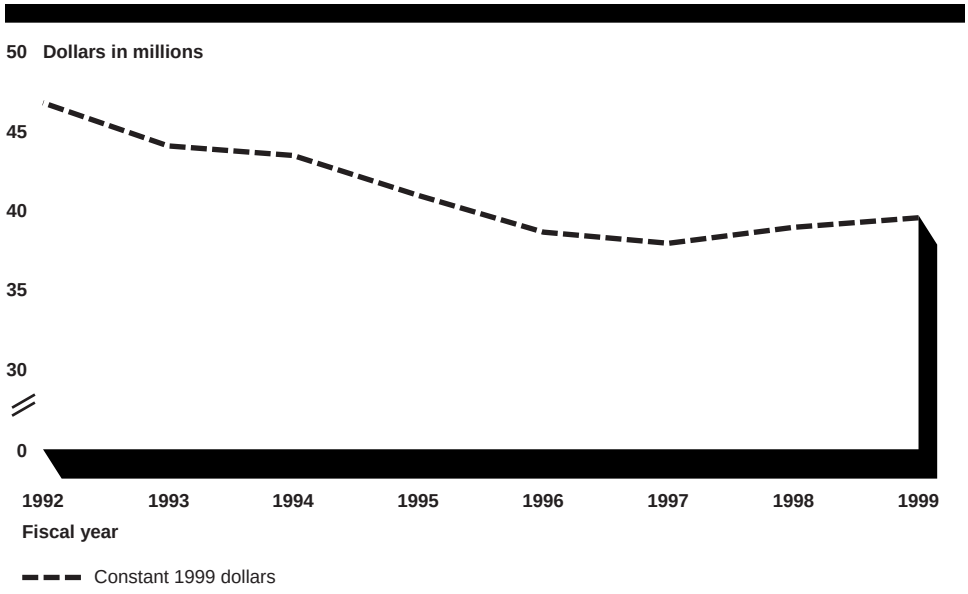
While overall funding for the Fish and Wildlife Service has increased from fiscal years 1992 through 1999, operating and maintenance funding for the National Fish Hatchery System, as measured in constant 1999 dollars,[2] has declined by about 15 percent. Fiscal year 1992 appropriations were $46.7 million in constant dollars, compared with $39.5 million for fiscal year 1999 (see fig. 2).[3] During the same period, total operating appropriations for the Service rose by 34 percent, from $493 million to $661 million, as measured in constant 1999 dollars.[4] However, the hatcheries' share of these appropriations declined from about 9 percent to 6 percent. This decline was, in part, the result of the lack of sufficient increases in appropriations to cover the increased costs of operations, maintenance, and construction; administrative streamlining; hatchery closures; and moving priorities for new funding towards other programs.

[2]"Constant 1999 dollars" means that the appropriations from prior years have been adjusted to account for the change in the Consumer Price Index. The amounts reported for fiscal years 1992 through 1998 reflect the purchasing power of those dollars in terms of what a dollar could buy in fiscal year 1999. Operations and maintenance funds provide moneys for such things as salaries, utility expenses, routine vehicle and building maintenance, fish food and drugs, and other supplies.

[3]In addition to appropriations for the hatcheries' operations and maintenance, the Service receives some fisheries-related appropriations under other categories (such as fish and wildlife management), as well as funds for replacing fisheries lost as a result of federal water projects. (See app. I for details on these additional sources of funds).

[4]These amounts exclude research and development funds.

Figure 2: Operating and Maintenance Funding for the National Fish Hatchery System, Fiscal Years 1992 Through 1999



Note: Amounts are in constant 1999 dollars.

Source: GAO's analysis of data from the Fish and Wildlife Service.

The Federal Hatcheries Have Reported Staffing Shortages, Maintenance Shortfalls, and Equipment Problems

Officials at Fish and Wildlife Service headquarters and at the 13 federal hatcheries we visited said that declining appropriations have resulted in an inability to fully staff hatchery positions. Nationwide, about 125 positions, or one-fourth of all the positions at federal hatcheries, were vacant, and, according to agency managers, funds were not available to fill them. Adequate staffing at fish hatcheries is needed because fish require daily feeding and tank cleaning, and failure to do this could cause stressful situations that harm the health of the fish. In addition, the staff must be available 24 hours a day in case of emergencies, such as pump failures or interruptions of water supplies, which could jeopardize the entire production of a hatchery. Vacant positions include hatchery managers, biologists, geneticists, and maintenance workers. For example:

- The Dexter National Fish Hatchery and Technology Center in New Mexico, which breeds and raises several of the nation's most endangered fish species, does not have three of its allotted staff because the facility has lacked the necessary operating funds. One of these positions is the director, a position that has been vacant for more than a year.

- At the Leadville National Fish Hatchery in Colorado, the fish biologist position has been vacant since February 1994 because of inadequate funds. To deal with this shortage and still achieve production and mission goals, the hatchery has relied on numerous volunteers during the past 4 years. However, hatchery staff said turnover among volunteers has been high.

Many of the hatchery managers we spoke with also reported that they were unable to maintain or perform preventative maintenance on facilities and equipment. According to Service officials, the average federal hatchery is 55 years old and has several million dollars in accumulated maintenance needs that have been deferred over the years. By their estimation, the National System needs about $110 million for maintenance.[5] By comparison, the National System's appropriation for maintenance was about $7.4 million in fiscal year 1999—or only about 7 percent of its total needs. Several hatchery managers reported losses of fish, some of which were classified as threatened or endangered, because of equipment failures or malfunctions. For example:

- In April 1999, 198 endangered Gila trout died at the Mescalero National Fish Hatchery in New Mexico when a seal failed in an older holding tank. An official from the Fisheries Resource Office in New Mexico estimated that these fish represented 25 percent of the native population in one of the two streams where these fish are found. More importantly, he said these fish were spawning-age adults that were being used to reintroduce this species into Arizona and move towards delisting the species from the Endangered Species List. This effort has now been delayed.
- In December 1998, 700 threatened Gulf of Mexico sturgeon died at the Welaka National Fish Hatchery in Florida when an aerator system failed. Hatchery staff said a backup system that could have saved the fish was not operating because maintenance funds were unavailable to repair it.

Managers at some facilities said they have been unable to obtain needed equipment. According to an official at the Dexter National Fish Hatchery and Technology Center, that facility has lacked the funds to purchase specialized laboratory equipment needed to propagate and protect threatened or endangered fish species. At the Mammoth Spring National Fish Hatchery, we observed researchers using benches and chairs for makeshift laboratory workspace.

[5]In addition to deferred maintenance needs, the National System reported a backlog of $168 million for construction items. Construction items are funded by a separate budget account and are not part of the operations and maintenance funds addressed in this report.

The Distribution of Fish and Fish Eggs Has Declined

In recent years, the distribution of fish and fish eggs from federal hatcheries has declined. As table 2 shows, fish distribution declined from about 204 million fish in fiscal year 1992 to about 164 million fish in fiscal year 1998, a decrease of 19 percent. In contrast, the number of pounds of fish distributed decreased by only 6 percent, from about 6 million pounds in 1992 to about 5.7 million pounds in 1998. The number of eggs distributed declined from 132 million to about 122 million, a decrease of 8 percent.[6] Hatchery managers said one of the reasons for the decline in the distribution of fish and fish eggs was the lack of money to repair the fishponds and the facilities used to rear fish. However, while the federal hatcheries have been distributing fewer fish, the decline in pounds of fish has been relatively small because many of those fish have been larger.

Table 2: The Distribution of Fish and Fish Eggs From Federal Hatcheries, Fiscal Years 1992 Through 1998

Fiscal year	Number of fish distributed (in thousands)	Pounds of fish distributed (in thousands)	Number of eggs distributed (in thousands)
1992	203,687	6,030	132,329
1993	213,529	6,220	263,476
1994	177,070	6,120	151,137
1995	168,463	5,978	138,800
1996	161,491	5,504	144,504
1997	165,564	5,500	112,904
1998	164,260	5,664	121,540

Source: Fish and Wildlife Service.

The Federal Hatcheries Have Taken Measures to Cope With Declining Budgets

Managers have taken some steps, such as the following, to cope with decreasing funds.

- Transferring federal hatcheries to states: During fiscal years 1996 through 1997, the Fish and Wildlife Service transferred six hatcheries to states—one each in Alabama, Georgia, Mississippi, North Carolina, South Carolina, and West Virginia.
- Seeking additional funding from nonfederal sources: Some facilities have received funds from states or other entities. For example, the federal hatcheries in Colorado and Montana have received partial compensation

[6]Some federal hatcheries maintain desired strains of mature, spawning-age fish that produce eggs that are used to meet the production needs of the National System. These "broodstock" hatcheries provide eggs to other federal hatcheries and to state hatcheries, other federal agencies, and universities to support restoration efforts, help meet mitigation responsibilities, promote research and technological development, and help provide recreational fishing opportunities.

for raising rainbow trout for state waters. The Warm Springs Fish Health Laboratory in Georgia has charged commercial producers that want to ship sterile grass carp to other parts of the country for the laboratory's inspection and certification services.

- Seeking alternatives to contracting: Some federal hatcheries and fish centers are using in-house staff or other resources to build or maintain projects that otherwise would have been done by contract. In-house staff at Colorado's Hotchkiss National Fish Hatchery built a mesh enclosure to protect its fish from herons and other predators. According to the hatchery manager, the total project cost $42,000, compared to a contract's estimate of $90,000 to $110,000. The Warm Springs National Fish Hatchery in Georgia used electricians and bulldozer operators from the National Guard to install electrical wiring and reshape its fishponds.

Most Distributions From Federal Hatcheries Have Benefited Recreational and Commercial Fisheries

Our review of the Fish and Wildlife Service's distribution records found that they gave an incorrect picture of the degree to which federal hatcheries have been focusing on the Service's recovery and restoration programs. According to the Service, most of the fish and fish eggs distributed by its hatcheries had been used in these two programs. However, we found that more than half of the distribution that the Service had classified as related to these programs did not meet their definitions. While most of the fish and fish eggs had been distributed to waters that are under federal jurisdiction, they actually benefited recreational and commercial fisheries. Inasmuch as Fish and Wildlife Service managers have indicated that the priority for federal hatcheries should be recovering threatened or endangered species or restoring other imperiled fish to self-sustaining populations, most of their distributions were of nonnative, nonimperiled, or nonsustainable native fish, which have benefited commercial and recreational fisheries.

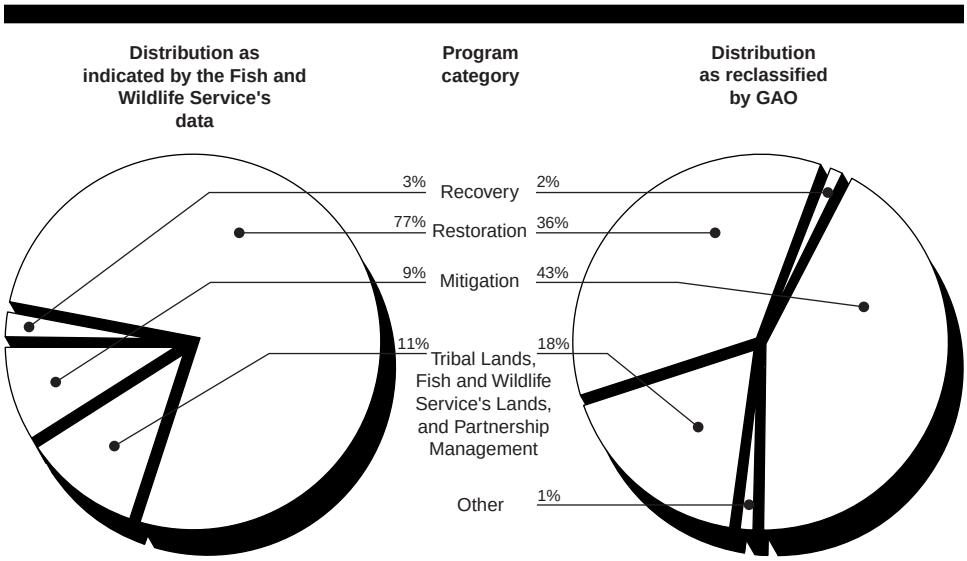
Fewer Fish and Fish Eggs Should Have Been Classified as Used for Restoration and Recovery

In fiscal year 1998, the last year for which complete information was available, federal hatcheries distributed about 163 million fish, weighing a total of about 5.7 million pounds, and about 122 million fish eggs.[7] The Service's data indicated that about 80 percent of the fish, representing about 56 percent of the pounds, and 29 percent of the fish eggs were for restoration or recovery projects. However, when we examined the various uses more closely and compared them with the definitions for the various programs, we found that only 38 percent of the fish, representing about

[7]This amount of fish is more than 1.6 million (about 1 percent) less than the amount identified by the Service and included in table 2. We found that this amount of 1.6 million should have been excluded because of such reasons as double counting.

20 percent of the pounds, and 23 percent of the fish eggs should have been classified as having gone for restoration or recovery efforts. Figure 3 compares the distribution of hatchery fish according to the Service's records with our adjustments to more accurately reflect the Service's definitions.[8]

Figure 3: Initial and Reclassified Fish Distribution, Fiscal Year 1998



Source: GAO's analysis of data from the Fish and Wildlife Service.

According to the Service's program definitions, for a usage to be classified as restoration or recovery, it must involve an attempt to achieve a self-sustaining population of a native fish that is threatened, endangered, or otherwise imperiled in some way. We found several instances in which hatcheries had classified distribution as recovery or restoration even though the fish were nonnative, were not imperiled, or were not being used for the purpose of developing a self-sustaining population. For example:

- The Mescalero National Fish Hatchery in New Mexico had classified the distribution of more than 37,000 rainbow trout (a common nonnative species) as recovery because these fish had been sent to the Dexter

[8]See app. II for additional information on fish and fish egg distribution by program category and major species of fish produced in each region of the Service.

National Fish Hatchery and Technology Center, where they had been used as food for the endangered Colorado pikeminnow. Similarly, the Orangeburg National Fish Hatchery in South Carolina had classified the distribution of 1.2 million bluegill (a common species) under the recovery program because the fish had been stocked into waters at national wildlife refuges as food for endangered wood storks.

- The Natchitoches National Fish Hatchery in Louisiana classified the distribution of nearly 1 million bluegill, channel catfish, and largemouth bass (all common species) as restoration because they were stocked into waters at a national wildlife refuge in Louisiana in order to establish a recreational fishery. Although these fish are native to Louisiana, they are not threatened, endangered, or imperiled and had not previously inhabited the waters where they were stocked.
- The Little White Salmon National Fish Hatchery along the Washington side of the Columbia River classified the distribution of more than 3 million fall and spring chinook salmon as restoration. Despite being native to the area, the fish could never establish self-sustaining populations because a dam had obliterated their natural spawning habitat.
- The Fish and Wildlife Service classified the distribution of the threatened Apache Trout at the Alchesay-Williams Creek National Fish Hatchery as recovery. However, the hatchery's manager told us that its trout production was no longer used for the recovery program but was being used to supplement the recreational fishery on the Apache Indian reservation.
- The Garrison Dam National Fish Hatchery in North Dakota classified the distribution of over 7.2 million black crappie, northern pike, small mouth bass, and walleye as restoration when, in fact, these fish had been used to offset the impact of dam construction and other federal water projects in the area. Although these fish are native to the area, they are not threatened, endangered, or imperiled.

Our findings should not be interpreted to mean that federal hatcheries have been doing things they are not authorized to do—only that the Fish and Wildlife Service has not been providing an accurate picture of how the activities at those hatcheries have been aligned with its priorities. Nearly all of the differences in classification involved fish and eggs classified as being used for recovery and restoration purposes when they had actually been used to mitigate the effects of federal water projects. Mitigation, like most purposes other than recovery or restoration, is the stocking of native or nonnative fish to maintain or replace harvest levels lost as a result of federal water projects and often involves stocking bodies of water that have little or no spawning habitat to support self-sustaining populations.

The fish—often nonnative species—are either stocked at a catchable size (called "put and take") or are stocked and allowed to grow until they are of catchable size (called "put, grow, and take"). For example:

- The rainbow trout, which has been introduced throughout the country, is native only to the rivers and streams of the Pacific Coast and Pacific Northwest. When this fish species has been stocked into reservoirs and rivers in other parts of the country, there has been little or no reproduction because of the lack of suitable habitat. In fiscal year 1998, rainbow trout accounted for most of the "put and take" stocking, representing almost 40 percent of the total pounds of fish produced at federal hatcheries.
- Some species, such as lake trout, northern pike, bass, and channel catfish, have been stocked into nonnative waters and have successfully reproduced. All of these fish are game fish that are sought after as recreational fish. At times, these fish have threatened the survival of native species because of their reproduction and predatory natures. According to Service officials, in recent years, the stocking of nonnative fish has been done much more cautiously.
- Some species, such as the salmon species native to the Pacific Northwest, have been stocked in their native waters to replace or maintain harvest levels lost as a result of federal water projects. Although millions of these fish have been stocked into native waters, self-sustaining populations are not possible because of numerous factors, including a lack of sufficient spawning habitat, predation by nonnative fishes, and impacts from human activities, which have prevented many of these fish from reaching maturity and returning to reproduce in self-sustaining numbers.

Classifying these uses as recovery or restoration, rather than as mitigation or some other more appropriate category, does not provide an accurate picture of what federal hatcheries have been doing.[9]

Most Fish and Fish Eggs Have Been Placed in Waters Under Federal Jurisdiction

In fiscal year 1998, most of the fish and fish eggs distributed from federal hatcheries were placed in waters under the jurisdiction of the federal government (see table 3). These waters include those on federally owned lands and those that cross governmental boundaries (such as the Columbia River, the Great Lakes, and the Mississippi River). That year, 75 percent of the fish from federal hatcheries and 53 percent of their fish eggs were distributed to waters under federal jurisdiction. Waters under

[9]See app. III for a listing of fish and fish egg distribution, by Service region, for the recovery and restoration programs.

state jurisdiction received the next largest portion, with smaller numbers going to tribal and local governments.

Table 3: The Distribution of Fish and Fish Eggs by Entity Controlling the Waters, Fiscal Year 1998

Program and product	Amount (in thousands)	Percentage
Federal government		
Fish	122,663	75
Pounds of fish	4,480	79
Fish eggs	64,721	53
State government		
Fish	31,883	20
Pounds of fish	629	11
Fish eggs	52,875	44
Local government		
Fish	989	1
Pounds of fish	21	0.4
Fish eggs	432	0.4
Tribal government		
Fish	6,611	4
Pounds of fish	518	9
Fish eggs	2,866	2
Other		
Fish	504	0.3
Pounds of fish	6	0.1
Fish eggs	646	0.5

Source: GAO's analysis of data provided by the Fish and Wildlife Service.

Managers Say Health and Disease Problems From Hatchery Fish Can Be Minimized

Officials from the Service and from science and industry groups that deal with fisheries acknowledged that most of what is known about fish diseases and how to control them has been learned from hatchery operations but that there is still much to learn about the interaction between hatchery production and natural ecosystems. In general, the officials from the federal hatcheries and health centers that we spoke with made the following points about the health and disease problems in hatchery fish:

- Hatchery fish are subject to stresses that can promote the manifestation of health and disease problems. Similar health and disease problems affect both wild and hatchery fish, but hatchery fish face stresses that cause

these problems to more readily manifest themselves.[10] These stresses include being reared in high populations densities, being subjected to fluctuations in water temperature and quality, and having to undergo human handling and transporting to the site where they will be released.

- Most health and disease problems can be minimized by reducing fish population densities and other stresses or by using antibiotics. Hatchery managers said they reduce the number of fish being reared and the changes in water quality or temperature to minimize most of the health and disease problems found there. These practices help reduce the need to use antibiotics, which are used primarily for internal bacterial infections.
- Survey efforts are under way to determine the distribution of certain diseases among wild fish and develop health information on interactions between wild and hatchery fish. In 1997, the Service started the National Wild Fish Health Survey. This effort began when an outbreak of "whirling disease" depleted wild trout stocks in the Rocky Mountains.[11] In fiscal year 1998, the Service spent $1.8 million investigating the whirling disease parasite, expanding the survey to gather additional information on the prevalence of various fish pathogens, and developing a database to examine relationships among fish diseases and various features of water quality and fish habitat. This survey included an analysis of more than 13,000 fish from 422 sites in 38 states.
- When unexpected health or disease problems occur, fish and fish eggs have sometimes been destroyed to prevent the problems from being transmitted to other fish. In 1988 a viral disease was identified in salmon stocks at the Makah National Fish Hatchery in Washington. Because the virus may have been imported from Europe, all of the fish at that hatchery were destroyed. At the Little White Salmon National Fish Hatchery in Washington, salmon that return to the hatchery to spawn are tested for bacterial kidney disease, and according to the hatchery manager, the eggs of those fish with a high exposure to the disease are destroyed.
- When fish that may be diseased are introduced into the wild, it is according to state regulations. In 1994, the pathogen for whirling disease was found in the waters and the fish at the Leadville National Fish Hatchery in Colorado. With the concurrence of state fish and game officials and in accordance with state regulations for controlling that

[10]App. IV provides more information on several diseases found in federal hatcheries in the National System.

[11]Whirling disease is a parasitic infection that attacks cartilage in trout and salmon, causing deformities. Infected fish display a distinctive rapid whirling, or swimming in circles. The disease can be fatal to very young fish, and there is no known cure.

disease, fish from this hatchery were stocked in streams in which whirling disease already existed or in restricted bodies of water.[12]

Conclusions

Over the past 8 years, operating and maintenance appropriations for the National Fish Hatchery System have decreased. According to Fish and Wildlife Service officials and hatchery managers, this decline has been the principal reason for not being able to fill positions, maintain production, and keep facilities properly maintained. Deciding what course of action to take in the face of such shortages requires, among other things, a clear understanding of the role and responsibilities of federal hatcheries. However, information on how federal hatcheries have been supporting the Service's programs through the distribution of fish and fish eggs has not been reliable. Although the Service classified most of this distribution as being focused on recovering threatened or endangered species or restoring other imperiled fish to self-sustainability, in reality, the principal focus has been the distribution of nonnative, nonimperiled, or nonsustainable native fish to maintain or enhance commercial and recreational fisheries. The overstatement of fish and fish egg distribution associated with the recovery and restoration programs has understated the hatcheries' activities that have principally been used to benefit commercial and recreational fisheries. The Service's classification of distribution does not provide a clear picture of the unique role that federal hatcheries are supposed to fill.

Recommendation

To provide the Congress with the information needed to evaluate the appropriate role of the National Fish Hatchery System, we recommend that the Secretary of the Interior direct the Director of the Fish and Wildlife Service to take steps to refine the classification system for fish and fish egg distribution and help ensure that hatchery managers appropriately classify all fish and fish egg distribution by its principal purpose.

Agency Comments

We provided a copy of this report to the Department of the Interior for review and comment. The agency agreed with our findings and recommendation. It also stated that reputable hatchery managers and scientists continue to disagree about such terms as recovery, restoration,

[12]Restricted bodies of water are waters where fish infected with whirling disease may be stocked without a significant threat of spreading the parasite. For example, a reservoir on the eastern plains of Colorado would be considered a restricted body of water because it does not feed into other bodies of water with native wild trout populations.

and mitigation. The agency said that it is committed to describing its hatchery distribution programs in a manner that accurately addresses the concerns of those seeking information and that, in January 1999, it began to investigate methods for doing so. It also provided comments on the factual content of the report, and we made changes as appropriate. The agency's comments are included as appendix VI.

Our work included analyses of budget, financial, and distribution data. We obtained this information from Fish and Wildlife Service headquarters and, where necessary, from four of the six regional offices (Albuquerque, Atlanta, Denver, and Portland) that have hatcheries. To more closely assess the effects of current funding levels, we visited 13 of the 67 federal fish hatcheries, 3 of the 9 fish health centers, and 4 of the 7 fish technology centers. Appendix V lists the specific facilities that we visited.

To identify funding trends, we analyzed financial data and reports for fiscal years 1992 through 1999, which were obtained from the Service's headquarters and the four regional offices we visited. We also reviewed annual reports for fiscal years 1994 through 1998 and other pertinent financial data for the hatcheries we visited. In addition, we interviewed officials at the Service's headquarters, regional offices, hatcheries, fish technology centers, and fish health centers to obtain their opinions of funding needs and impacts.

To describe fish and fish egg distribution for fiscal year 1998, the Service provided us with its fiscal year 1998 fish and fish egg distribution database and the program definitions used to classify this information. We then took the data on distribution related to recovery and restoration programs and asked the management at all the hatcheries that had these two programs to explain the end use of each fish species they had classified as used for them. We used their responses to our questions about the end uses and the Service's definitions of these programs to more accurately reclassify the distribution to other program categories. We then showed the results of our analyses to headquarters officials for their judgments on our recategorizing of the data and made changes as necessary. We used data from the Service's automated database to determine the destination of fish and fish egg distribution.

To describe fish health and disease problems at federal hatcheries, we spoke with Service officials and collected data from officials at fish health

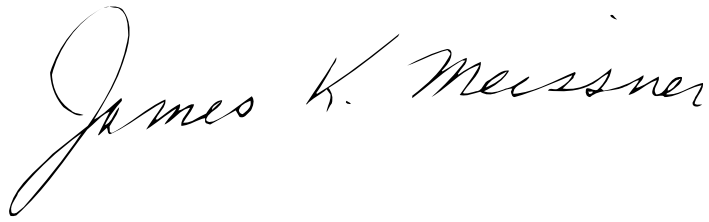
centers and hatcheries. We did not address the issue of possible genetic changes among hatchery-raised fish.

We performed our work from April 1999 through September 1999 in accordance with generally accepted government auditing standards.

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 7 days from the date of this letter. At that time, we will send copies to interested congressional committees. We are providing copies of this report to the Honorable Bruce Babbitt, Secretary of Interior, and to the Honorable Jamie Rappaport Clark, Director, Fish and Wildlife Service. We will also make copies available to others on request.

If you or your staff have any questions, please call me at (206) 287-4810. Major contributors to this report were Alan Dominicci, Kelley Layman, and Bill Temmler.

Sincerely yours,



James K. Meissner
Associate Director,
Energy, Resources, and Science Issues

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Funding for the National Fish Hatchery System

This appendix presents additional information about the amounts of money available to fund hatchery operations and hatchery-related activities within the U.S. Fish and Wildlife Service. Table I.1 shows how funds for these activities are organized: hatchery operations and maintenance, the Lower Snake River Compensation Plan, and fish and wildlife management. The Lower Snake River Compensation Plan is a program to replace sport fisheries in Washington and Idaho that were lost by the construction and the operation of federal dams on the lower 150 miles of the Snake River. Only about $1 million, or about 9 percent, of this appropriation goes to federal hatcheries, and this amount goes to three facilities in Idaho—the Dworshak National Fish Hatchery, the Dworshak Fish Health Center, and the Hagerman National Fish Hatchery. Most of the remaining funds go to other federal hatcheries in Idaho, Oregon, and Washington, which are owned by the Service but are operated by states and tribes under agreements with it.

The Service's appropriations for fish and wildlife management are spent, among other things, for the management of interjurisdictional fisheries, the promotion and the development of recreational fisheries, the recovery of threatened or endangered species, and the restoration of species that soon might be listed. For example, the fish and wildlife management program conducts population studies to determine trends in fish stocks and evaluates and quantifies habitat for aquatic resources. The degree to which appropriations for this program are used for hatchery-related management is unknown. The table also shows the total for the three activities and the total operations appropriation for the Service for fiscal years 1992 through 1999.[13]

[13]For consistency, we excluded agency research and development funds in fiscal years 1992 and 1993 because, beginning with fiscal year 1994, all these funds were transferred to the National Biological Survey, which was changed to the National Biological Service and subsequently merged into the U.S. Geological Survey in 1996.

Table I.1: Fisheries-Related Appropriations, Fiscal Years 1992 Through 1999

Amounts in thousands of dollars and in constant 1999 dollars

Fiscal year	Hatchery operations	Lower Snake River	Fish and wildlife management	Total fisheries-related	Total for Fish and Wildlife Service's operations
1992	46,711	12,272	13,706	**72,690**	493,413
1993	44,047	11,868	15,026	**70,941**	497,317
1994	43,376	12,896	17,309	**73,581**	540,251
1995	40,913	12,495	16,910	**70,317**	545,279
1996	38,636	12,100	17,002	**67,739**	526,233
1997	37,935	11,881	18,287	**68,103**	540,776
1998	38,934	11,786	21,294	**72,014**	603,523
1999	39,527	11,648	22,387	**73,562**	661,136

[a]The Bonneville Power Administration reimburses the U.S. Treasury for expenditures for the Lower Snake River Compensation Plan.

[b]These appropriations are for resource management.

Source: GAO's analysis of data provided by the Fish and Wildlife Service.

In addition to these appropriated funds, some hatcheries and fish health and technology centers receive funds from federal and state agencies and from private entities for fish production or other services. In fiscal year 1998 this additional funding amounted to about $8.8 million. Of this amount, about $8.3 million, or 94 percent, went to various salmon-producing national fish hatcheries and fish health and technology centers in Idaho, Oregon, and Washington to mitigate the impacts caused by federal water projects. The Bureau of Reclamation, the U.S. Army Corps of Engineers, and the National Marine Fisheries Service are the primary agencies providing these funds, which are different from the funds provided under the Lower Snake River Compensation Plan.

For these additional funding sources, we were unable to develop year-by-year funding amounts going back to fiscal year 1992.

Comparison of Fish and Wildlife Service's Data on the Total Distribution of Fish and Fish Eggs With GAO's Recalculations, Fiscal Year 1998

Program and product	Fish and Wildlife Service's total distribution (in thousands)	GAO's recalculated total distribution (in thousands)
Recovery		
Fish	4,677	3,229
Pounds of fish	120	79
Fish eggs	780	1,303
Restoration		
Fish	126,612	58,238
Pounds of fish	3,047	1,038
Fish eggs	34,919	26,737
Mitigation		
Fish	15,318	70,746
Pounds of fish	1,848	3,590
Fish eggs	61,040	66,468
Fish and Wildlife Service lands		
Fish	4,063	7,663
Pounds of fish	33	76
Fish eggs	715	872
Tribal lands		
Fish	3,159	10,131
Pounds of fish	351	575
Fish eggs	3,422	3,935
Partnership management		
Fish	10,433	11,116
Pounds of fish	264	288
Fish eggs	20,663	20,473
Research and development[a]		
Fish	NA[b]	243
Pounds of fish	NA	7
Fish eggs	NA	1,483
Food for others[c]		
Fish	NA	1,285
Pound of fish	NA	2
Fish eggs	NA	0
Not counted/deleted[d]		
Fish	NA	1,609
Pounds of fish	NA	8
Fish eggs	NA	0

(Table notes on next page)

[a]Includes fish and eggs identified as having been sent to laboratories, aquariums, or other research entities.

[b]Not applicable refers to fish and fish egg distribution that did not fit any of the Service's definitions.

[c]Includes rainbow trout used as food for the endangered Colorado pikeminnow (a fish species) at the Dexter National Fish Hatchery and Technology Center and bluegills used as food for the endangered wood stork (a bird species) in South Carolina.

[d]Represents numbers we did not count as distribution in fiscal year 1998, including fish counted twice in the distribution at one hatchery, salmon transferred from a state hatchery to a federal hatchery for tagging purposes and returned to the state hatchery for release, rainbow trout purchased by an Indian tribe from a private hatchery and held in a federal hatchery prior to stocking, and mussels raised at one federal hatchery and counted as fish distribution.

Source: GAO's analysis of data provided by the Fish and Wildlife Service.

Table II.2: Top Five Fish Distributed by Each Region According to Their Amount and Weight, Fiscal Year 1998

Species	Amount (in thousands)	Species	Weight(in thousands of pounds)
Region 1			
Fall chinook	52,136	Steelhead	835
Spring chinook	10,077	Spring chinook	484
Coho salmon	6,934	Fall chinook	455
Steelhead	4,847	Coho salmon	393
Chum salmon	2,322	Cutthroat	78
Region 2			
Channel catfish	2,236	Rainbow trout	350
Rainbow trout	1,381	Channel catfish	104
Largemouth bass	1,072	Apache trout	22
Smallmouth bass	132	Cutthroat	9
Striped bass	111	Brown trout	8
Region 3			
Lake trout	5,980	Lake trout	354
Walleye	2,584	Rainbow trout	92
Sauger	777	Brook trout	3
Rainbow trout	342	Brown trout	2
Brook trout	30	White bass	.6
Region 4			
Striped bass	7,354	Rainbow trout	1,257
Rainbow trout	6,494	Brown trout	62
Bluegill	2,324	Striped bass	38
Redbreast sunfish	1,297	Cutthroat	18

(continued)

Species	Amount (in thousands)	Species	Weight(in thousands of pounds)
Brown trout	593	Channel catfish	12
Region 5			
Atlantic salmon	15,439	Atlantic salmon	169
American shad	3,997	Lake trout	58
Lake trout	770	Rainbow trout	42
Striped bass	287	Landlocked salmon	16
Landlocked salmon	220	Striped bass	.3
Region 6			
Walleye	12,648	Rainbow trout	419
Northern pike	6,034	Cutthroat	147
Rainbow trout	4,327	Lake trout	23
Yellow perch	1,162	Paddlefish	6
Cutthroat	1,074	Walleye	5

Note: Fish and Wildlife Service Regions are as follows:

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and the Pacific Trust Territories

Region 2: Arizona, New Mexico, Oklahoma, and Texas

Region 3: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin

Region 4: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands

Region 5: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia, and the District of Columbia

Region 6: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming

Region 7: Includes Alaska, which does not have any fish hatcheries

Source: GAO's analysis of data provided by the Fish and Wildlife Service.

Fish and Fish Egg Distribution Under the Recovery and Restoration Programs, by Fish and Wildlife Service Region, Fiscal Year 1998

Region	Fish (in thousands)	Fish eggs (in thousands)
1	27,259	0
2	227	0
3	5,993	11,852
4	7,478	0
5	20,162	13,515
6	347	2,673
Total	**61,466**	**28,040**

Note: Fish and Wildlife Service Regions are as follows:

Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and the Pacific Trust Territories

Region 2: Arizona, New Mexico, Oklahoma, and Texas

Region 3: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin

Region 4: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico, and the Virgin Islands

Region 5: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia, and the District of Columbia

Region 6: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming

Region 7: Includes Alaska, which does not have any fish hatcheries

Source: GAO's analysis of data provided by the Fish and Wildlife Service.

Diseases Found in Some National Fish Hatcheries, Treatment Options, and Disposition of Fish

Disease	Treatment options	Disposition of fish
Bacterial kidney disease	Modify diet, use antibiotics, and/or reduce stress	Destroy highly diseased fish (and high-risk eggs) or release them into endemic waters[a]
Bacterial gill disease	Increase water flow, reduce density of fish population, and/or use antibiotics or drugs	Following recovery, release fish
Whirling disease	No known treatment, avoid exposure to pathogen	Destroy or release fish into closed bodies of water or endemic waters
Enteric red mouth disease	Vaccinate or use antibiotics	Following recovery, release fish into endemic waters or destroy them
Furunculosis	Vaccinate or use antibiotics	Following recovery, release fish into endemic waters or destroy them
Enteric septicemia	Use antibiotics	Following recovery, release fish into endemic waters or destroy them
Asian tapeworm	No known practical cure,[b] avoid exposure to pathogen	Destroy or release fish into endemic waters according to state regulations
Coldwater disease	Use antibiotics or reduce rearing stress	Following recovery, release fish
Columnaris disease	Use antibiotics or reduce temperature stress	Following recovery, release fish

[a]Endemic waters are those waters where the pathogen is native or naturally occurring.

[b]According to fish health center officials, the drug treatment for this pathogen is highly toxic and not legal for use in fish that may be consumed as food.

Source: GAO's analysis of data provided by the Fish and Wildlife Service.

Federal Facilities GAO Visited

Headquarters	Division of Hatcheries, Arlington, Virginia
Region 1	Regional Office, Portland, Oregon Abernathy Salmon Culture Technical Center, Longview, Washington Hagerman National Fish Hatchery, Hagerman, Idaho Little White Salmon National Fish Hatchery, Cook, Washington Olympia Fish Health Center, Olympia, Washington Quinault National Fish Hatchery, Humptulips, Washington Warm Springs National Fish Hatchery, Warm Springs, Oregon
Region 2	Regional Office, Albuquerque, New Mexico Dexter National Fish Hatchery and Technology Center; Dexter, New Mexico Mescalero National Fish Hatchery, Mescalero, New Mexico
Region 4	Regional Office, Atlanta, Georgia Mammoth Spring National Fish Hatchery, Mammoth Spring, Arkansas Norfork National Fish Hatchery, Norfork, Arkansas Warm Springs National Fish Hatchery, Warm Springs, Georgia Warm Springs Regional Fisheries Laboratory, Warm Springs, Georgia Warm Springs Fish Health Laboratory, Warm Springs, Georgia Welaka National Fish Hatchery, Welaka, Florida
Region 6	Regional Office, Lakewood, Colorado Bozeman Fish Health Center, Bozeman, Montana Bozeman Fish Technology Center, Bozeman, Montana Ennis National Fish Hatchery, Ennis, Montana Hotchkiss National Fish Hatchery, Hotchkiss, Colorado Leadville National Fish Hatchery, Leadville, Colorado

Comments From the Department of the Interior

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

SEP 21 1999

Mr. James K. Meissner
Regional Manager, Energy, Resources, and Science Issues
U.S. General Accounting Office
701 Fifth Avenue
Seattle, Washington 98104

Dear Mr. Meissner:

Thank you for providing the Department of the Interior the opportunity to review and comment on the General Accounting Office's draft report entitled, "NATIONAL FISH HATCHERIES: Classification of Fish and Egg Production Needs Refinement" (GAO/RCED-99-262). We are pleased to note that many of the comments and changes we offered previously for your consideration were included in the report. In addition to those comments, the Fish and Wildlife Service's Division of National Fish Hatcheries has had continued and recent discussions with GAO auditors about the report.

In general we agree with your findings and your recommendation that the Fish and Wildlife Service take steps to refine the classification system for fish and egg distribution and help ensure that the National Fish Hatchery System appropriately classifies all fish and egg distribution by its principal purpose. We understand that there continue to be disagreements among reputable fishery managers and scientists concerning terms like "recovery," "restoration," and "mitigation" and are committed to describing our hatchery production programs in a manner that addresses the concerns of those seeking information. In fact, the Service began to investigate methods for doing so in January 1999.

Our specific comments are enclosed. We hope that they will assist you in preparing the final report.

Sincerely,

For Assistant Secretary for Fish and Wildlife and Parks

Enclosure

Enclosure

Comments on Draft GAO Report: *NATIONAL FISH HATCHERIES - Classification of Fish and Egg Production Needs Refinement*

Page 6, the last sentence of the first paragraph. REPLACE with the sentence: "This decline was, in part, the result of the lack of sufficient increases in appropriations to cover increased costs of operations, maintenance and construction, of administrative streamlining, of hatchery closures, and of moving priorities for new funding towards other programs."

Page 10, the first sentence of the second paragraph. REPLACE with the sentences: "The bulk of current fish and egg distribution at federal hatcheries has been to maintain or replace fish populations adversely impacted by federal water development projects, although the Fish and Wildlife Service's records currently indicate otherwise. These hatchery fish benefit recreational and commercial fishermen."

Page 17, fourth line from the bottom. REPLACE the phrase, "... for the benefit of commercial or recreational fisherman." With the phrase, "... to maintain fisheries that benefit commercial or recreational fishermen."

Page18, the second paragraph under Agency Comments. CHANGE the number of fish technology centers from 6 to 7 as appears on page 4.

Page 20, footnote 13. REPLACE the last three words "... Biological Research Service." with the words, "... National Biological Survey, which was changed to National Biological Service and subsequently merged into the U.S. Geological Survey in 1996."

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