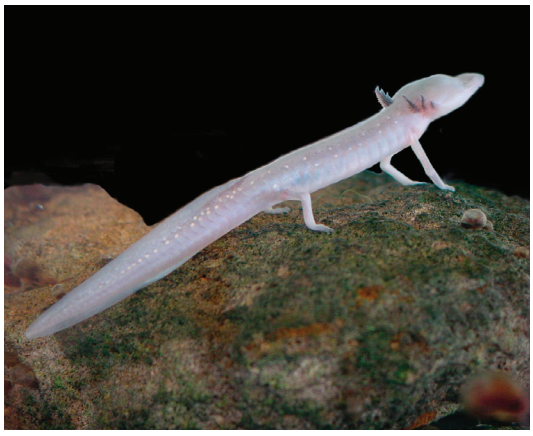
U.S. Fish & Wildlife Service

National Fish Hatchery System

Strategic Hatchery and Workforce Planning Report

March 2013



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Cover Photos (Clockwise from top left):
(1) Angler holding a 19.5 pound Lahontan Cutthroat trout from Pyramid Lake, NV. Endangered Lahontan Cutthroat trout are propagated at the Lahontan National Fish Hatchery, NV; (2) Federally endangered Higgins' eye pearly mussels cultured at the Genoa National Fish Hatchery, WI; (3) USFWS employee spawning Coaster brook trout at Genoa NFH, WI; (4) USFWS Neosho NFH and Blind Pony SFH employees spawning endangered Pallid sturgeon; (5) The endangered Texas Blind Salamander is propagated at the USFWS' San Marcos Aquatic Resource Center, TX; (6) USFWS employee capturing an Alligator gar. Alligator gar are propagated at Mammoth Springs, Natchitoches, Private John Allen, and Warm Springs, GA NFHs.

Executive Summary

Since its establishment in 1871, the U.S. Fish and Wildlife Service's (Service's) National Fish Hatchery System (NFHS) has been a cornerstone of the Service's mission of working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. To meet the needs of the American people in a changing social and economic climate, the NFHS has been proactive in implementing creative strategies for assessing, deploying, and managing its workforce. The Service initiated this review to ensure that the NFHS could operate more efficiently and effectively. As part of this review, the Service established priorities for Service funding of NFHS fish and other aquatic species propagation programs consistent with the Service's mission and priorities.

This review ranked funding priorities of the NFHS propagation programs in the following order:

1. Recovery of species federally listed as threatened or endangered;
2. Restoration of imperiled aquatic species;
3. Tribal partnerships and trust responsibilities;
4. Other Propagation Programs for Native Species; and
5. Other Propagation Programs for Non-Native Species.

With these priorities in mind, five funding scenarios were generated and their impacts evaluated. These five scenarios outline adjustments to Service funding for NFHS propagation programs (based on Fiscal Year (FY) 2012 enacted funding) at level funding, a 5 percent increase, an 11 percent reduction, a 15 percent reduction, and a 24 percent reduction. The 11, 15, and 24 percent reductions were used because they represented the points at which clean breaks between different categories of propagation programs occurred, thus avoiding the need to make value judgments among programs within a single category for the purpose of this review. Service funding is defined as those funds appropriated by Congress directly to the Service and does not include funds from other sources. In summary, the results of these funding scenarios are as follows:

- With the level funding or a 5 percent increase, Service funding within regions would shift from lower to higher priority propagation programs. This would further focus Service funding on the highest priority propagation programs. In the near-term, it would improve the condition of facilities that support recovery and restoration of native species, and allow small increases in staffing where appropriate. Both level funding and a 5 percent increase would also likely improve the Service's ability to work with partners on efforts that contribute to the recovery and restoration of native species. However, over time, these benefits are expected to diminish without periodic adjustments to account for rising uncontrolled costs. The NFHS is an operations-intensive program and has experienced significant increases in uncontrollable costs, particularly those related to energy. Under all funding scenarios, the NFHS will need to eliminate services without additional resources.

- An 11 percent decrease in Service funding would result in a reduction of approximately $3.1 million, which would eliminate Service funding for non-native species propagation other

than to meet tribal trust and fully reimbursed mitigation responsibilities, with a total of 56 propagation programs affected.

- A 15 percent decrease in Service funding would result in a reduction of approximately $4.2 million, which would eliminate Service funding for 79 lower priority programs, including those for native species propagation that do not contribute to meeting recovery, restoration, or tribal needs and for non-native species that do not contribute to tribal trust responsibilities required by treaty, legislation, court order, or consent decree.

- A 24 percent decrease in Service funding would result in a reduction of approximately $6.6 million and eliminate Service funding for 92 propagation programs, while again eliminating Service funding for native species propagation programs that do not contribute to meeting recovery, restoration, or mandated tribal needs and for non-native species that do not contribute to mandated tribal trust responsibilities. The key difference between this and the 15 percent reduction scenario is that all tribal programs not specifically required or covered by treaty or legislation, consent decree or court order, including those which produce native species to meet tribal needs, would be eliminated.

- Under all scenarios, lower priority programs that are funded from external sources would continue if reimbursed funding is sufficient to support them, even if those programs might otherwise be terminated if they were funded solely from Service hatchery funds. Mitigation programs supported by reimbursable funding would continue at levels commensurate with funding.

After analyzing the impacts of the above scenarios to the NFHS, several critical issues were identified.

- **Current NFHS propagation programs focus on the Service's highest priorities.** In FY 2012, nearly 90 percent of Service hatchery funding focused on highest priority propagation programs: recovery of species federally listed as threatened or endangered; restoration of imperiled aquatic species, and tribal programs. As such, the reduction scenarios not only cut all lower priority programs, but also may affect high priority programs, including some tribal trust programs.

- **Even under level funding or 5 percent increase, the NFHS will require additional resources to continue to produce its present services.** In FY 2012, some regions operated under a shortfall requiring other Service funding to fill those deficits. Therefore, even under level funding, without additional resources the NFHS will need to eliminate services. While nearly 90 percent of Service hatchery funding is already being allocated to the highest priority programs, in order to make these programs whole where possible, and where appropriate, the NFHS would phase out Service funding for non-native species propagation to maintain priority programs, meet core staffing requirements, and achieve sustainable ratios of salaries to other operational costs. To offset some of these reductions, the Service is seeking full reimbursement for mitigation programs from the agencies that carry mitigation obligations. Without adequate investment, the NFHS's ability to maintain or enhance current propagation programs may be unsustainable. Future investment in the NFHS must be driven

by strategic business decisions and must consider the criteria and limiting factors identified in this report.

- **If reductions are necessary, multiple impacts will likely occur throughout the NFHS, affecting Service partners and the economy at large.** In addition to the NFHS programs that contribute toward species recovery and restoration, the NFHS propagates and ships millions of fish eggs and releases many millions of fish, making a significant contribution to recreational, commercial, and tribal fisheries in lakes, streams, and marine environments across the continent. This generates hundreds of millions of dollars annually and creates thousands of jobs associated with these fisheries. The Service is committed to working with its many partners, tribes, and others as changes to the NFHS occur.

- **If budgets allow for it, time should be given to implement any of the funding scenarios.** Each shift in funding calls for significant internal changes, as well as substantial changes affecting federal, state, tribal and other partners. The Review Team recommends that if budgets are able to accommodate it, time should be given to implement any funding shift. The reduction scenarios entail significant changes to facilities, staffing and partners, and thus may take time to implement. Significant changes to propagation programs, in many cases, may take years to implement because most of these programs are conducted with key partners and are connected to propagation programs carried out by those partners. A period of transition and adjustment is recommended to prepare for those changes.

I. Introduction

The U.S. Fish and Wildlife Service (Service) completed a review of its 70 fish and other aquatic species propagation hatcheries within the National Fish Hatchery System (NFHS) with the primary purpose of ensuring that the NFHS is well positioned to address the current and future aquatic resource conservation needs of the United States.

A Review Team comprised of the Assistant Regional Directors for Fisheries and some headquarters staff was identified for this task. The Service Director appointed the Alaska Regional Director to oversee the Review Team and development of the review.

The review was precipitated, in part, by staffing and budget challenges experienced by NFHS facilities in various regions. Recognizing the constraints of insufficient budgets, the goal of the review was to ensure that the NFHS could operate more efficiently and effectively. The review evaluated the optimal number of hatcheries and employees necessary to meet the Service's priorities under alternative levels of funding. In this report, all NFHS propagation programs have been categorized using a clear set of criteria. These criteria allow the Service to look holistically at its propagation programs to assess how they fit within current Service priorities and how the aquatic species being produced will advance fish and aquatic resource conservation. This report will help the NFHS adapt to changing budgets, allow for emergency situations, accommodate new aquatic species recovery and restoration priorities, and assure that high priority propagation programs take precedence over lower priority programs.

II. Background

History, Function, and Value of the National Fish Hatchery System

The National Fish Hatchery System (NFHS) was established in 1871 by Congress to conserve fishery resources for future generations of Americans. Growing concern over declines in our nation's fish stocks prompted the establishment of a nationwide system of fish culture and fish and other aquatic species propagation expertise and facilities that ultimately became the NFHS. Since its inception over 140 years ago, the NFHS has evolved to become a major network of hatcheries, laboratories, and research centers addressing a wide variety of species propagation programs and needs.

The mission of today's NFHS includes a focus on the culture and distribution of fish, mussels, and other aquatic species federally listed as threatened or endangered. The NFHS also works to restore declining populations of native fish and other aquatic species so as to prevent listing under the Endangered Species Act. In addition, the NFHS works in partnership with states and federally-recognized tribes to restore depleted native fish stocks and provide for lost recreational fishing opportunities as mitigation for impacts resulting from federal water projects. Nationwide, this mitigation work is mostly funded by the responsible federal water development agencies

Over the last few years, the Service's budget has proposed that mitigation fish hatcheries be funded by the responsible federal water development agencies that operate the projects for which mitigation is needed. The Service understands that the fish supplied by these hatcheries provide important economic opportunities to the states, tribes, and recreational communities and the Service supports the continuation of this work on a reimbursable basis. Continuing mitigation work on a reimbursable basis will enable the Service to redirect hatchery funding to the highest priorities, including recovery of threatened and endangered species, restoration of imperiled species, and fulfillment of tribal trust responsibilities, which are activities that are central to the Service's mission and mandates. However, without full reimbursement, the Service will need to adjust the amount of fish produced. The Service will continue propagation at mitigation fish hatcheries if fully funded, but will discontinue where the Service does not receive reimbursable funding or reduce, as needed, commensurate with the amount of reimbursable funding.

The NFHS has evolved to reflect contemporary priorities of the Service and remains a vital component of the agency's conservation vision for aquatic species management on a national scale. This evolution has been accompanied by numerous prior reviews and analyses of budgets, staffing, facility condition assessments, and propagation capacities of the NFHS. These reviews included detailed evaluations of the workforce needed to effectively operate the NFHS, taking into account the diversity of propagation activities and hatchery design variations that frequently drive staffing requirements and other operating costs.

Today, the NFHS serves many new purposes and stakeholders, while at the same time maintaining many of its traditional roles. The present network of National Fish Hatcheries, Fish Technology Centers, and Fish Health Centers achieve the goals of science-based fish and aquatic conservation. The diversity of species, activities, and functions of the NFHS speaks to a much

broader role and identity for the system than in previous times. In many ways, the NFHS functions as a network of aquatic resource conservation centers within which fish propagation is just one of many benefits. For example, the NFHS is actively engaged in species recovery and restoration, in meeting federal mitigation responsibilities, and in fulfilling trust obligations to the sovereign tribes. The NFHS also provides aquatic refugia, centers for basic and applied research, opportunities for aquatic education, and places of interest for visitors. In many instances, the system models state-of-the-art approaches to water reuse and treatment, resource conservation and energy efficiency. Also of major significance, are the water rights the NFHS holds for specific hatcheries. These water rights are essential to meeting present and future propagation goals as well as water needs for conserving the aquatic resources of a nation adapting to a changing climate. The NFHS is a complex and dynamic network of assets and expertise operating to support the Service's mission.

Current Funding Allocation for the National Fish Hatchery System

Allocations to the Service's regions for operation of the NFHS are currently determined by the methodologies included in the *Fisheries and Habitat Conservation Allocation Handbook.* The Handbook describes historical information on funding allocations and the adjustments in each of the sub-activities within the Fisheries Program budget. This information is used to determine base budget allocations to each region and any adjustments needed in a given fiscal year. The Handbook is revised annually. Future changes to the allocation formulas used to fund the NFHS (hatchery operations and hatchery maintenance) will reflect changes in the NFHS priorities and how those priorities are to be addressed within each region.

The NFHS, like many Service programs, has experienced an erosion of base funds due to reductions in appropriations, inflation, and other factors. Because of the nature of its mission, the NFHS is an operations-intensive program and has experienced significant increases in uncontrollable costs, particularly those related to energy (fuel for fish distribution, heating/cooling facilities, movement of water via pumps, and fish food). Maintaining the required levels of Quality Assurance/Quality Control, ensuring all required fish health protocols are being performed, and meeting higher environmental compliance standards, is challenging due to those uncontrollable costs. This erosion of base funds impedes the ability of the NFHS to be operated at its fullest and most efficient capacity.

Reimbursable funding is an important source of funds for the NFHS, particularly for supporting propagation programs that mitigate for population impacts from federal water projects, such as dams. Many of these mitigation programs are fully reimbursed, but several are not and the Service continues to work with other federal agencies to achieve the needed full reimbursement of costs associated with rearing and distributing fish to mitigate for federal water projects. The NFHS also carries out a limited number of other reimbursed propagation programs that benefit state and tribal fisheries, but are not for the purpose of fulfilling mitigation requirements or tribal trust obligations. Such programs are premised on receiving full reimbursement from the benefited entity and assurances that the programs do not displace propagation that is a higher priority for the Service.

III. Approach

Review Team and Purpose

The review of the 70 fish and other aquatic species propagation hatcheries within the National Fish Hatchery System (NFHS) was led by the U.S. Fish and Wildlife Service's (Service's) Alaska Regional Director. The Review Team consisted of Fisheries Program leadership from the Service's headquarters and all of its eight regions. The Review Team was advised by a Directorate Advisory Group comprised of senior Service leadership. The Directorate Advisory Group was utilized to explain rationale and decisions made throughout the process. The Review Team established a timeline for completion of this review and established subgroups to collect and analyze data. The Review Team held weekly conference calls, met face-to-face on a monthly basis, and regularly briefed the Directorate Advisory Group.

The Review Team focused on the 70 propagation hatcheries, rather than the much broader program that includes Fish Health Centers, Fish Technology Centers, and Fishery Resource Offices.

The purposes of the review were to:

- Identify the highest priority propagation programs for the Service.
- Determine the optimal number of hatcheries and employees to achieve Service goals.
- Reach and maintain a more balanced ratio of salaries to other operational costs.
- Operate the NFHS within available funding.
- Make informed decisions about where to focus efforts given current, declining or increasing budgets, and where operations would be reduced or expanded accordingly.
- Position hatcheries to meet current and future aquatic resource conservation needs of the nation.
- Improve alignment of Service funding with the Service's vision.

To maximize effectiveness, the Review Team utilized and updated data gathered through previous Fisheries programmatic reviews, such as past stakeholder reviews, Office of Management and Budget reviews, Governmental Accounting Office reviews, and Fisheries Program Strategic Plans. To complete the review, the Review Team conducted a workforce analysis, established and ranked categories for the NFHS propagation programs, sorted existing programs into these categories, and used this information to develop funding scenarios.

Stakeholders and partners play a pivotal role in managing shared conservation challenges, and the Service has a long standing and important relationship with Tribal governments in collaborating to conserve and enhance fish and wildlife resources for future generations. With that in mind, the Service notified conservation partners, states, and tribes about the review and committed to communicating with them and keeping them apprised of the progress. The Service communicated via letters and conference calls, and provided opportunities for follow up.

Conducting the Workforce Analysis

To conduct the workforce analysis, the Review Team updated the 2005 Fisheries Program budget and staffing analysis with data from FY 2012. The Review Team also considered the 2008 National Wildlife Refuge System, *Strategic Workforce Planning Report*, and the 2003 Fisheries Program, *High Priority Staffing Positions for the National Fish Hatchery System* report for applicable approaches to the NFHS review. These documents helped inform staffing levels and requirements, organizational structure, operating budgets, and an optimum ratio of salaries to other operational costs. The results of the workforce analysis are presented in Section IV.

Setting Priorities for Propagation Programs

As the Review Team set priorities for NFHS propagation programs, it considered the mission and priorities of the Service established by acts of Congress, presidential executive orders, secretarial orders, and other controlling authorities. Foremost among these authorities is the federal Endangered Species Act of 1973 (ESA). The ESA compels the Service to give priority to preventing the extinction or extirpation of protected fish and wildlife species by regulating actions that would further diminish populations and by working to recover those populations to viability. Further, the Service is also charged with assisting in the restoration of other species that have been severely diminished so as to prevent their decline to being federally listed as threatened or endangered. Another important role is based on the Department of the Interior's (Department) trust responsibilities to Native American Tribes. These responsibilities are established both in treaty and law and commit, among other things, to assuring that tribes have continued access to the fish and wildlife resources on which they depend. An overarching priority that shapes the Service's ESA, tribal trust, and other actions is the concept of "trust" species. Trust species are those that are protected under ESA, those found on lands and waters of the National Wildlife Refuge System, and those considered by tribes as important to their way of life. An important characteristic of trust species is that they are those species native to the United States and its territories.

Accordingly, the Review Team identified recovery of species federally listed as threatened or endangered as the most important use of Service funds and personnel. Restoring diminished populations of native fish and aquatic organisms to prevent further decline, preventing the need to list those species for protection, or to restore them to abundance for their many benefits to society was also identified as a top priority. The Service's role in fulfilling the Department's trust obligations to Native American tribes ranked high. These top three priorities were followed by propagation programs that support recreational or commercial fisheries. Throughout the ranking of programs, consistent with the concept of "trust" species, propagation of native species always took priority over programs that propagate non-native species. This ranking was for the purpose of identifying priority use of funds appropriated to the Service to implement its core programs, considering the Service's current priorities, and was not intended to judge the relative value of specific fish propagation programs and their benefits to society at large.

The following are the priorities of NFHS propagation programs developed by the Review Team and ranked from highest priority to lowest priority:

1. **Recovery:** Recovery of aquatic species federally listed as threatened or endangered.
2. **Restoration:** Restoration of imperiled aquatic species to restore to abundance or prevent further decline.
3. **Tribal Programs:**
    a. Tribal Trust/Non-Discretionary – Programs specifically required by treaty or legislation, or required or supervised by a court pursuant to a consent decree or court order.
    b. Tribal Trust/General Authority – Programs established under the authority of a treaty or legislation and operated under the Service's general tribal trust responsibilities.
    c. Tribal Fisheries/Native Fish – Programs not established or otherwise required by law, treaty, or litigation and operated to support tribal fisheries by propagating native fish species.
    d. Tribal Fisheries/Non-native Fish – Programs not established or otherwise required by law, treaty, or litigation and operated to support tribal fisheries by propagating non-native fish species.
4. **Other Propagation Programs for Native Species:**
    a. Native species propagation that fulfills mitigation obligations of other federal agencies and for which the Service is fully reimbursed.
    b. Native species propagation that fulfills mitigation obligations of other federal agencies and for which the Service is not fully reimbursed
    c. Native species propagation that is not for mitigation purposes and for which the Service is fully reimbursed.
    d. Native species propagation that is not for mitigation purposes and for which the Service is not fully reimbursed.
5. **Other Propagation Programs for Non-Native Species:**
    a. Non-native species propagation that fulfills mitigation obligations of other federal agencies and for which the Service is fully reimbursed.
    b. Non-native species propagation that fulfills mitigation obligations of other federal agencies and for which the Service is not fully reimbursed.
    c. Non-native species propagation that is not for mitigation purposes and for which the Service is fully reimbursed.
    d. Non-native species propagation that is not for mitigation purposes and for which the Service is not fully reimbursed.

Sorting Propagation Programs into Categories

The Review Team identified all the propagation programs conducted in FY 2012 at the 70 hatcheries in the NFHS. For each of these programs, the Review Team identified the primary purpose of the program, the species propagated by those programs, and the amounts and sources of funding that supported those programs in FY 2012 (Appendix A). The Review Team used this information to sort the programs into the priority categories. Propagation programs were categorized into the highest priority category they fit. For example, a program to propagate a native species that was federally listed as threatened was placed in the recovery category, rather than the native species category. Similarly, a program to propagate a non-native species to meet

tribal trust responsibilities was placed in one of two subcategories under the tribal category.

Developing Funding Scenarios

The Review Team considered the information developed in the workforce analysis, the priorities for categories of propagation programs, and the sorted list of propagation programs to assess how the NFHS would respond to different levels of funding.

The Review Team developed scenarios for the types of propagation programs that would be supported under five different levels of Service funding best aligned with the Service's mission. Levels of funding considered relative to FY 2012 were:

1. Level funding
2. 11 percent reduction
3. 15 percent reduction
4. 24 percent reduction
5. 5 percent increase

The Review Team used 11, 15, and 24 percent reductions because they represented the points at which clean breaks between different categories of propagation programs occurred, thus avoiding the need to make value judgments among programs within a single category for the purpose of this review.

For the level funding and 5 percent increase scenarios, the Review Team allowed regions the flexibility to move Service funding from lower priority programs to higher priority programs and to shift programs from lower priority species to higher priority species. Although a difficult and time consuming exercise for the regions, this approach allowed the regions to consider the information from the workforce analysis to better address the needs of their higher priority propagation programs and the facilities and staff that support those programs.

For each of the reduction scenarios, the Review Team accommodated the reductions in funding by discontinuing Service funding for the propagation programs in the lowest priority categories. To accommodate greater reductions in Service funding, it was necessary to discontinue Service funding for increasing numbers of the lowest priority propagation programs. For these reduction scenarios, the Review Team discontinued Service funding for all the programs in a specific category, rather than discontinuing Service funding for select programs within a category. For the reduction scenarios, the Review Team did not consider moving funding from programs in lower priority categories to higher priority categories, mostly because even the 11 percent reduction scenario left little Service funding in the lower priority categories. It should be noted that, even under the reduction scenarios, lower priority programs that are funded from external sources generally continue to the extent that the reimbursed funding is sufficient to support them, even if those programs might otherwise be terminated if they were funded solely from Service hatchery funds.

The regions used information about the propagation programs that would no longer receive Service funding under each of the scenarios to identify potential impacts to facilities and

staffing. The regions considered information from the workforce analysis as well as additional information on facilities, including:

- Facility Condition Index of the hatchery;
- Scope and cost of deferred maintenance;
- Recent investments that addressed deferred maintenance and/or major new construction;
- Estimated cost to rehabilitate or replace existing facilities (Current Replacement Value);
- Significant safety issues;
- Quantity and quality of each hatchery's water supply;
- Consistency with the Service's Fish Health Policy;
- Ability to meet federal/state water quality standards;
- Significance and/or security of water rights associated with a hatchery; and
- Presence of invasive species or disease pathogens that could affect water quality or fish health.

This information was used to identify strategic approaches to minimizing the impacts of reductions in funding. For example, consolidation of propagation programs at fewer hatcheries may increase the number of programs that would be supported at a given funding level. The regions identified which hatcheries would be best situated to continue to support those programs, and to ensure that those hatcheries were adequately staffed and funded. The funding scenarios and their potential impacts are summarized in Section V of this report.

IV. Results of the Workforce Analysis

National Fish Hatchery System Staffing Requirements

In 2003, in response to proposed reductions in the National Fish Hatchery System (NFHS) budget, a workgroup evaluated current and future staffing requirements of the NFHS. The workgroup's product, *High Priority Staffing Positions of the National Fish Hatchery System*, included review of the National Fish Hatcheries, Fish Technology Centers, and Fish Health Centers. Although this document looked at the system as a whole, including positions at Fish Technology Centers and Fish Health Centers, the portion of the report evaluating staffing requirements of the NFHS is applicable to this review. As such, the Review Team adopted the report's conclusions and updated other sections to reflect current staffing profiles of the NFHS. The 2003 report identified the following as typical positions needed in the NFHS. These positions are outlined on all current organizational charts of the NFHS, and were confirmed in the current review of workforce planning, including:

- Hatchery Manager
- Assistant Hatchery Manager
- Biologists (fish biologists or other specialized positions e.g. malacologists)
- Fish Culturists (biological technicians or animal caretakers)
- Maintenance Workers
- Administrative Officer/Technician
- Outreach Specialists

Additionally, four different facility sizes were identified by the 2003 workgroup. The Review Team used the same categories to classify hatcheries for this report:

- Stand-alone small hatcheries
- Larger stand-alone hatcheries
- Hatchery complex with at least two facilities
- Large multiple station complexes

The Review Team updated the NFHS facility classification and existing staff levels for FY 2012. In addition, the Review Team identified mission-essential staffing for each facility classification and staff required to fill essential positions (Appendix B). The updated staffing information was then used to evaluate ratios of salaries to other operational costs, and provide recommendations for a target ratio for the NFHS. It should be noted that these mission-essential staffing needs are based on FY 2012 programs at each hatchery, and may not accurately reflect needs based on changes identified in the various scenarios.

Targeting a Ratio of Salaries to Other Operational Costs

In 2005, at the request of the U.S. House of Representatives, Committee on Appropriations, the Fisheries Program performed a budget and staffing analysis of the NFHS. As a result, a 70 percent to 30 percent ratio of salaries to other operational costs was recommended for the NFHS.

The Review Team assessed whether this ratio was applicable in the context of current NFHS facility size, complexity, and staffing. In recent years, energy costs associated with heating, chilling, and pumping water; fuel costs associated with fish distribution; and the cost of fish feed have risen at a faster pace than salaries. In the past ten years, NFHS facilities have constructed complex water treatment facilities to meet increasingly restrictive fish health and Clean Water Act requirements for influent and effluent water. These treatment systems typically carry higher operational costs due to complex filtration processes and ultraviolet disinfection systems. After analyzing today's NFHS operations, the Review Team concluded that a more appropriate ratio of salaries to other operational costs for the current propagation hatcheries is 65 percent to 35 percent. This ratio and the mission-essential staffing levels the Review Team identified for the NFHS in FY 2012 represent benchmarks employed in the level funding and 5 percent increase scenarios described in Section V.

V. Funding Scenarios and Propagation Program Impacts

The following sections describe the baseline and each of the budget scenarios, highlighting available funding, focus of that funding, and effects associated with each scenario. Detailed information on the budget scenarios and regional impacts are included in the appendices.

Description of Baseline Funding

The NFHS is funded through Service hatchery funding, comprised of hatchery operations and hatchery maintenance funding, as well as non-Service, reimbursable funding. In FY 2012, the Service had $45.9 million in hatchery operations funding and $17.5 million in hatchery maintenance funding. Of those amounts, $21.6 million in hatchery operations funding and $6.3 million in hatchery maintenance funding directly supported the 70 fish and other aquatic species propagation hatcheries being considered in this review. The remainder of the Service hatchery funding primarily supported the Service's Fish Health and Fish Technology Centers, and administration of all of the Service's operations and maintenance associated with the Service's fish facilities. In addition to the $27.9 million in Service hatchery funding, the NFHS also received $25.5 million in reimbursable funding in FY 2012 (Table 1).

Table 1. *Summary of the total number of propagation programs and the funding amounts and sources for those programs for each of the types of propagation.*

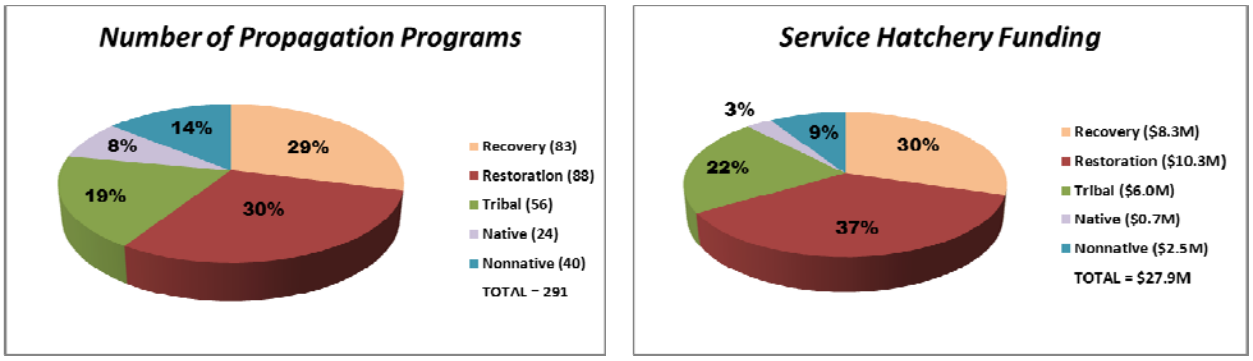
Type of Propagation	Number of programs	Funding (millions)			
		Service hatchery operations and maintenance	Other Service	Total Service	Reimbursable
Recovery	83	$8.3	$0.3	$8.6	$5.7
Restoration	88	$10.3	$1.0	$11.2	$3.1
Tribal	56	$6.0	$0.0	$6.1	$10.5
Native	24	$0.7	$0.1	$ 0.9	$1.8
Non-native	40	$2.5	$0.7	$ 3.2	$4.3
Total	291	$27.9	$2.1	$30.0	$25.5

In FY 2012, the Service augmented its hatchery funding with $2.1 million to meet budget shortfalls for some facilities and propagation programs (Table 1). These other Service funds included reprogrammed hatchery deferred maintenance funds and funds from other programs. These funds helped meet budget shortfalls that year, but were not intended to sustain the facilities or propagation programs into the future.

In FY 2012, 291 propagation programs were carried out at the 70 propagation hatcheries. More than 75 percent of the propagation programs fell into the three highest priority categories for Service funding: recovery, restoration, and tribal (Figure 1 and Table 1). Fewer than 25 percent of the propagation programs fell into lower priority categories, including programs that produced native and non-native species for purposes other than recovery, restoration, or tribal programs.

Not only were the Service's propagation programs directed toward the three highest priority categories, but nearly 90 percent of the Service's hatchery funding supported propagation programs in the recovery, restoration, and tribal categories in FY 2012 (Table 1 and Figure 1).

Figure 1. *Summary of the total number of propagation programs and the funding amounts and sources for those programs for each of the types of propagation.*



Level Funding Scenario

Level funding assumes Service funding in future years would remain equivalent to that provided for operations ($21.6 million) and maintenance ($6.3 million) in FY 2012. This funding does not include the additional $2.1 million in other Service funding that was used in FY 2012 to meet budget shortfalls. These additional funds were not intended to sustain the facilities or propagation programs into the future. Without these additional funds and with increasing costs over time, the Service could not sustain into the future the breadth and scope of the propagation programs it did in FY 2012. Thus, level funding would require reductions in some lower priority programs to sustain higher priority programs. As part of this scenario, the Review Team decided to allow regions the flexibility to move Service funding from lower priority propagation programs to higher priority programs and to transition programs from lower priority species to higher priority species.

The reductions to accommodate these changes will include discontinuing Service funding for some of the lower priority propagation programs in regions where those funds could be focused on sustaining higher priority propagation programs. These reductions would discontinue Service funding for a number of propagation programs that produce non-native species for purposes other than meeting tribal trust responsibilities, mostly in Regions 2, 3, 4, 5, and 6 where those programs exist and the regions have the flexibility to move Service funding from those lower priority activities. Included in this total are several programs maintained to support the National Broodstock Program. Because Region 4 experienced almost the entire $2.1 million shortfall in FY 2012, it did not have as much flexibility as other regions and would need to consider reducing Service funding for some higher priority propagation programs, including some recovery and restoration programs.

If we continued under level funding, the Service would reduce funding for some non-native species propagation and, where available, focus that funding on propagation of native species, mostly to support recovery and restoration of native species, activities that in many cases

continue to support recreational fisheries. As a result, the total overall Service funding for non-native species propagation would be reduced by more than 60 percent. In Regions 2, 3, 5, and 6 the funding made available by reducing funding for non-native species propagation would be focused on recovery of native species federally listed as threatened or endangered and restoration of imperiled native species. In contrast, reductions due to loss of other Service funds that made up the FY 2012 budget shortfall in Region 4 would affect funding available for low priority programs and for propagating species for recovery and restoration. Overall, redirection of Service funding from lower priority programs would augment recovery and restoration programs by $1.1 million, except in Region 4 where recovery and restoration programs would be decreased by $0.45 million, for a net increase of $0.65 million (Appendix C).

Many of the programs that would no longer receive Service funding are conducted as mitigation for federal water projects or have strong support from the states that benefit from the programs. These include programs that could potentially no longer receive funding that was reprioritized as part of the more discretionary potential directions Regions 2, 3, 5, and 6 were able to take concerning their funding priorities moving forward. They also include less discretionary potential funding directions Region 4 could take to accommodate the FY 2012 budget shortfall. A number of these programs that would no longer receive Service funding under level funding are already supported by reimbursable funding. Those programs supported by reimbursable funding would continue at a reduced level commensurate with non-Service funding. However, if reimbursable funding is increased in the future, then those programs would continue at levels commensurate with funding.

Because much of the Service funding that supported propagation programs would be moved to other higher priority propagation programs within regions, this scenario would not have substantial negative effects on facilities and staffing (Table 2). The Review Team identified a total of 23 facilities that would be affected under level funding. Most of the effects identified represent potential reprioritizations within regions from low to high priority propagation programs or from facilities focused on low-priority programs to facilities focused on higher priority programs. Only in Region 4 would the balance of effects be negative, where six facilities in Region 4 would experience major reductions in propagation programs, primarily due to efforts to cope with the FY 2012 budget shortfall. Five of those six facilities in Region 4 would likely go into caretaker status. The Review Team also identified a total of 23.5 full-time equivalents (FTEs) affected by these reductions. Four of these would be in Region 6 where reprioritization would allow the region to recruit additional staff. The other 19 positions would be in Region 4 where loss of other Service funding to cover the budget shortfall would require Region 4 to reduce or reassign staff. There would be costs associated with efforts in Region 4 to place facilities in caretaker status and accommodate staff reductions, but those are not included in this report.

Table 2. *Summary of the number of facilities and staff affected and funding reprioritizations and reductions in each of the regions affected by potential changes to meet the level funding scenario.*

Region	Number of facilities affected	FTEs affected	Hatchery funding reprioritized to higher priorities in millions	Other Service funding reductions in millions
1	1	0.5	$0.08	$0

2	1	0	$0.33	$0
3	2	0	$0.02	$0
4	6	-19	$0.64	$2.0
5	3	0	$0.33	$0
6	10	+4	$0.79	$0.01
Total	23	23.5	$2.07	$2.0

The primary effects of level funding are to improve the Service's ability to work with partners to contribute to recovery and restoration of native species. If the propagation programs identified as no longer receiving Service funding were reduced or discontinued, there would be effects on recreational fishing opportunities in the affected states, especially in Regions 4 and 6. The effects would include reductions in fish stocked by the Service and in eggs provided through the National Broodstock Program not only to other Service hatcheries, but also to other federal and state agency partners (see sub-section of this report titled "Impacts and Options for the National Broodstock Program"). The disease-free eggs provided through the National Broodstock Program are raised by partners to meet their mitigation and recreational fishery enhancement goals. To the extent there is a reduction in Service efforts to support recreational fisheries, these reductions will have economic impacts on the states in which those fisheries occur.

11 Percent Reduction Scenario

An 11 percent reduction in Service funding for the NFHS would total approximately $3.1 million. This reduction would be achieved by discontinuing Service funding for the 56 lowest priority propagation programs (Appendix D). This reduction would discontinue Service funding for all 40 programs that produce non-native species for purposes other than meeting tribal trust responsibilities. Included in this total are seven programs maintained to support the National Broodstock Program. This reduction would also discontinue funding for 16 programs that produce native species, primarily for recreational purposes for state partners and stocking programs on Service lands. With an 11 percent reduction, the Service would no longer fund propagation of non-native species except to meet tribal trust responsibilities. Service funding for native species propagation would focus on efforts to recover threatened and endangered species, restore imperiled aquatic species, and meet tribal trust responsibilities only where specifically covered or required by treaty, legislation, a consent decree, or court order.

If Service funding was no longer available for these programs, and if non-Service, reimbursable funding was not available to continue those programs, the Service would need to reduce or discontinue those propagation programs. Should all programs no longer receiving Service funding under this scenario be reduced or discontinued, there would be substantial effects on facilities, staffing, and local economies (Table 3). The Review Team identified a total of 20 facilities that would experience major reductions in propagation, with seven to eight of those likely to go into caretaker status and one closed. The Review Team also identified a total of 45 to 46 existing staff affected by these reductions, primarily in Regions 4 and 6. There would be costs associated with closing facilities and accommodating staff reductions, but those are not included in this report.

Table 3. *Summary of the number of facilities and staff affected and funding reductions in each of the regions affected by potential changes to meet the 11 percent reduction scenario.*

Region	Number of facilities with major reductions	FTEs affected	Hatchery funding reductions in millions	Other Service funding reductions in millions	Total Service funding reductions in millions
2	4	3	$0.33	$0	$0.33
3	1	0	$0.02	$0	$0.02
4	8	27	$0.90	$1.97	$2.87
5	1	3	$0.25	$0	$0.25
6	6	12-13	$1.58	$0.01	$1.59
Total	20	45-46	$3.08	$1.98	$5.06

If the propagation programs identified as no longer receiving Service funding under this scenario were reduced or discontinued, there would be substantial effects on recreational fishing opportunities in the affected states. The effects would include significant reductions in fish stocked by the Service and in eggs provided through the National Broodstock Program. The disease-free eggs provided through the National Broodstock Program are raised by partners to meet their mitigation and recreational fishery enhancement goals (see sub-section of this report titled "Impacts and Options for the National Broodstock Program").

A reduction in Service efforts to support recreational fisheries would have substantial economic impacts on the states in which those fisheries occur. A 2006 economics analysis prepared by the Service's Division of Economics showed that the NFHS stocked an estimated 123.1 million recreational fish, generating over 13 million angling days, $554 million dollars in retail sales, $903 million dollars of industrial output (i.e. monies generated by angler expenditures), $256 million dollars of job income, and 8,000 jobs. In addition, over $37 million dollars of federal tax income and $34 million dollars of state and local tax revenue were generated.

15 Percent Reduction Scenario

A 15 percent reduction in Service funding to the NFHS would total $4.2 million (or about a $1.1 million additional increment above the $3.1 million necessary to meet the 11 percent reduction scenario). This $4.2 million reduction would be accommodated by discontinuing Service funding for the 79 lowest priority propagation programs (Appendix D). The programs affected include programs that would no longer receive Service funding under the 11 percent reduction scenario, as well as the remaining eight programs that produce native species for purposes other than recovery or restoration or for tribal programs and another 15 programs that produce non-native species for tribes.

With a 15 percent reduction, Service funding for native species propagation would be limited to efforts to recover species federally listed as threatened or endangered, restore imperiled aquatic species, and meet tribal trust responsibilities specifically covered or required by treaty, legislation, a consent decree or court order. The Service would no longer fund propagation of non-native species except for $0.6 million in funding for non-native species propagation to meet tribal trust responsibilities specifically covered by a treaty, legislation, a consent decree or court

order. As a result, the total overall Service funding for non-native species propagation would be reduced by nearly 90 percent.

The eight additional native species propagation programs that would no longer receive Service funding under this scenario are primarily supported by non-Service, reimbursable funding, receiving a total of $0.12 million in Service funding and $1.7 million in reimbursable funding. It is unlikely that a loss of Service funding for these programs will have a substantial effect on these programs or go beyond the effects described under the 11 percent reduction scenario. These programs are similar to the programs that would be reduced under the 11 percent reduction scenario in that they are conducted to meet mitigation responsibilities and to enhance recreational fisheries in partnership with other federal and state agencies. To the extent that these eight additional native species propagation programs are reduced or discontinued, much of the discussion of impacts described for the 11 percent reduction scenario would apply to these programs as well.

About $1 million of the incremental funding reduction described above for the 11 percent reduction scenario affects 15 programs conducted to produce non-native species to meet tribal trust responsibilities. These programs were funded almost entirely by the Service in FY 2012 and received little non-Service, reimbursable funding. It is unlikely that these programs will receive additional funding from non-Service sources in the future and thus would likely be discontinued. If programs identified as no longer receiving funding under this scenario were discontinued, there would be substantial effects on facilities and staffing (Table 4). The Review Team identified a total of 29 facilities that would experience major reductions in propagation, with eight to nine of those likely to go into caretaker status and one closed. The Review Team also identified a total of 55 to 55.5 existing staff affected by these reductions, primarily in Regions 4 and 6.

Table 4. *Summary of the number of facilities and staff affected and funding reductions in each of the regions affected by potential changes to meet the 15 percent reduction scenario. These numbers include those reported in Table 3 for the 11 percent reduction scenario.*

Region	Number of facilities with major reductions	FTEs affected	Hatchery funding reductions in millions	Other Service funding reductions in millions	Total Service funding reductions in millions
1	1	0.5	$0.08	$0	$0.08
2	6	8	$0.72	$0	$0.72
3	1	0	$0.02	$0	$0.02
4	8	27	$0.94	$1.97	$2.91
5	1	3	$0.33	$0	$0.33
6	12	16.5-17	$2.11	$0.01	$2.11
Total	29	55-55.5	$4.21	$1.98	$6.15

If the propagation programs identified as no longer receiving Service funding were discontinued, there would be substantial effects on the 170 tribes that benefit from these programs. In some cases, these programs have been conducted for decades. Discontinuing these programs would reduce recreational fishing opportunities and have negative economic impacts on the tribes from loss of license sales and businesses associated with this recreational activity. A reduction in

Service efforts to support recreational fisheries on tribal lands would have substantial economic impacts on the tribes and in the states in which those fisheries occur. Since many tribal natural resource staffs are funded by tribal license sales, the loss of fish from the NFHS would cause significant reductions in tribal staff working on high priority Service recovery programs such as Mexican wolf and Rio Grande silvery minnow.

24 Percent Reduction Scenario

A 24 percent reduction in Service funding to the NFHS would total $6.6 million (or about a $2.4 million additional reduction to the $4.2 million necessary to meet the 15 percent reduction scenario). This $6.6 million reduction would discontinue Service funding for the 92 lowest priority propagation programs (Appendix D). These include the 79 programs that would no longer receive Service funding under the 15 percent reduction, as well as an additional 13 programs that produce native species for tribal programs not specifically covered or required by treaty or legislation, a consent decree or court order.

Service funding for tribal propagation programs would be limited to those programs specifically covered or required by treaty or legislation, a consent decree or court order. Service funding for native species propagation would be limited to efforts to recover threatened and endangered species, restore imperiled aquatic species, and tribal programs. The Service would no longer fund propagation of non-native species except for $0.6 million in funding for non-native species propagation to meet tribal trust responsibilities specifically covered by a treaty or legislation.

The additional 13 programs that would no longer receive Service funding under the 24 percent reduction scenario were funded entirely by the Service in FY 2012 and did not receive any non-Service, reimbursable funding. It is unlikely that these programs would receive funding from non-Service sources in the future. If Service funding was no longer available for these programs, the Service would need to discontinue these propagation programs. In the event that all of the programs identified as no longer receiving Service funding were discontinued, this loss of funding would have substantial effects on facilities and staffing (Table 5). The Review Team identified a total of 32 facilities that would experience major reductions in propagation, with 11 to 12 of those likely to go into caretaker status and one closed. The Review Team also identified a total of 76.2 to 77.2 existing staff affected by these reductions, primarily in Regions 1, 4 and 6.

Table 5. *Summary of the number of facilities and staff affected and funding reductions in each of the regions affected by potential changes to meet the 24 percent reduction scenario. These numbers include those reported in Table 4 for the 15 percent reduction scenario.*

Region	Number of facilities with major reductions	FTEs affected	Hatchery funding reductions in millions	Other Service funding reductions in millions	Total Service funding reduction in millions
1	3	20.7	$2.19	$0	$2.19
2	6	8	$0.86	$0	$0.86
3	2	1	$0.07	$0	$0.08
4	8	27	$0.94	$1.97	$2.91
5	1	3	$0.33	$0	$0.33
6	12	16.5-17.5	$2.15	$0.01	$2.15
Total	32	76.2-77.2	$6.56	$1.98	$8.52

If the additional propagation programs identified as no longer receiving Service funding under this scenario were discontinued, there would be substantial effects on the 170 tribes that benefit from these programs. Discontinuing these programs would also reduce recreational fishing opportunities on the affected tribal lands. A reduction in Service efforts to support recreational fisheries on tribal lands will have substantial economic impacts on the tribes and in the states in which those fisheries occur. Because impacts in Region 1 affect tribal propagation of salmon, impacts would likely extend to commercial and non-tribal recreational fisheries as well. Since many tribal natural resource staffs are funded by tribal license sales, the loss of fish from the NFHS would cause significant reductions in tribal staff working on high priority Service recovery programs.

5 Percent Increase Scenario

A 5 percent increase in Service funding for the NFHS would total approximately $1.4 million (Appendix C). The Review Team chose to build this scenario with the level funding scenario as a starting point, such that the 5 percent increase scenario includes the reprioritizations identified under the level funding scenario. The Review Team chose to allocate the additional funding to the regions based on existing allocation formulas, such that each region with propagation facilities received a portion of the funding (Table 6).

Table 6. *Summary of the number of facilities and staff affected and funding changes in each of the regions affected by potential changes to meet the 5 percent increase scenario. These numbers include those reported in Table 2 for the level funding scenario.*

Region	Number of facilities affected	FTEs affected	Hatchery funding increase in millions	Other Service funding reductions in millions	Total Service funding changes in millions
1	5	0	$0.20	$0	+$0.20
2	5	0	$0.29	$0	+$0.29
3	3	0	$0.19	$0	+$0.19
4	7	-17	$0.19	$1.97	-$1.78
5	5	+1	$0.23	$0	+$0.23
6	10	+5	$0.22	$0.01	+$0.23
8	1	+1	$0.07	$0	+$0.07
Total	36	24	$1.39	$1.98	-$0.58

Each region then allocated its additional funding to its highest priority activities, with most of the funding allocated to propagation programs that contribute to recovery and shoring up facilities with high ratios of salaries to other operational costs, especially at those facilities that support the highest priority propagation programs. As identified under level funding, because Region 4 experienced almost the entire $2.1 million shortfall in FY 2012, the additional $0.19 million funding they would receive under the 5 percent increase allocation still leaves a $1.78 million shortfall. As a result, Region 4 would continue to need to consider reducing Service funding for some higher priority propagation programs, including some recovery and restoration programs.

With a 5 percent increase, the Service would be able to better support propagation programs that contribute to recovery and restoration. As a result, Service funding for propagation programs that contribute to recovery would increase by nearly 20 percent over the FY 2012 baseline.

Any reductions to propagation programs, staffing, and facilities that would no longer receive Service funding with a 5 percent increase have already been described in the level funding section of this report. The effect of a 5 percent increase as compared to level funding is to increase funding for the highest priority propagation programs and facilities and increase the number of staff at those facilities by five positions (Table 6).

Any potential effects on partners or on economies with a 5 percent increase have already been described in the level funding section of this report. The primary effects of a 5 percent increase as compared to the level funding scenario are to improve the Service's ability to work with partners to contribute to recovery and restoration of native species, and to help sustain those efforts into the future.

Impacts and Options for the National Broodstock Program

During the review process, it was agreed that the regions would not give special treatment to the National Broodstock Program (Program) propagation programs in the initial analysis of the five scenarios, despite the truly interdependent function of these programs and facilities. It was recognized that three Program facilities in particular (Erwin National Fish Hatchery (NFH), White Sulphur Springs NFH, and Ennis NFH) would likely be severely affected by all scenarios because much of the propagation of these facilities falls into the lowest priority category (non-native species). As a result, the Review Team recommended that the unique importance and interdependent nature of these facilities be described and additional options be identified.

The Service established the Program in 1970 to ensure the availability of adequate numbers of disease-free inland salmonid eggs to satisfy the priorities of federal, state and tribal resource managers and researchers. The Program provides gametes and fertilized eggs of a variety of salmonids for recovery, restoration, and recreational fishing. The Service's well-established procedures for fish culture and fish health monitoring throughout the NFHS is critical to supporting and maintaining a Program that can ensure delivery of high-quality, disease-free eggs to partners across the country. Since 1970, the Program has maintained gene pools of distinct species and strains, many of which are no longer available in the wild, and can provide up to 60 million eggs annually to a wide range of partners across the country.

The primary use for these eggs is for mitigation of impacts from federal water projects (40 percent), fulfilling tribal trust responsibilities (6 percent), providing recreational fishing opportunities (23 percent), and research (1 percent). In the research arena, rainbow trout serve as a standard fish model for a broad range of aquatic research, thus the Program fulfills monthly requests from federal and state research facilities. These certified, disease-free eggs allow the Service, states, tribes, universities, research labs, and other federal agencies to produce an abundant supply of high-quality fish for stocking in accordance with the specific objectives of fisheries management plans and ensure the welfare of public fisheries. By serving as the national sole source of disease-free eggs, the Program maintains a uniform system of allocation priorities

and procedures. The collaborative effort is coordinated three to five years in advance and often includes tradeoffs between entities in lieu of an exchange of funds.

The Program includes three primary facilities specializing in rainbow trout broodstock and six facilities that maintain other species of broodstock along with other propagation programs. Ennis NFH (MT), Erwin NFH (TN), and White Sulphur Springs NFH (WV) maintain domestic strains of rainbow trout that can no longer be obtained from the wild. In addition, Saratoga NFH (WY) maintains lake trout and brown trout, Sullivan Creek NFH (MI) maintains lake trout, Iron River NFH (WI) maintains lake trout and coaster brook trout, Williams Creek NFH (AZ) maintains Apache trout, Jackson NFH (WY) maintains Snake River Cutthroat trout, and Lahontan NFH (NV) maintains Lahontan cutthroat trout, and Leadville NFH (CO) maintains greenback cutthroat trout (Table 7), all of which fulfill recovery and restoration goals contained in management plans. Each facility plays a unique role in the management of their particular strains and species. All inland salmonid broodstock facilities have Broodstock Management Plans outlining accepted methods for rearing, spawning, feeding, handling, and maintaining genetic variation. An effort is made to produce eggs in the most cost-effective manner consistent with sound biological principles without creating a shortage or surplus.

Table 7. *Broodstock strains maintained in National Broodstock Program Facilities*

Station	Species	Number of Strains
Ennis NFH	Rainbow Trout	6
Erwin NFH	Rainbow Trout	5
White Sulphur Springs NFH	Rainbow Trout	3
Iron River NFH	Lake Trout	2
	Coaster Brook Trout	2
Saratoga NFH	Brown Trout	1
	Lake Trout	1
Sullivan Creek NFH	Lake Trout	2
Williams Creek NFH	Apache Trout	1
Jackson NFH	Cutthroat Trout	1
Lahontan NFH	Lahontan Cutthroat Trout	1

A basic tenet of any broodstock program is to maintain the genetic viability of the strain being reared. In order to do this, an effective spawning population size needs to be established and maintained for each strain at each broodstock facility. It is also important to maintain a back-up of each strain at an effective number in case there is a disease outbreak at a broodstock station. The back-up protocols were fully implemented in the early 1990s after a pathogen discovery resulted in the loss of one rainbow trout strain and one brook trout strain from the Program. At least two mature year classes are maintained to ensure that the broodstock has the best representation of the captive population, and that the fish production cycle resulting from the eggs reaches its maximum potential in survival and in converting feed. Given this, the number of eggs an average brood unit might produce can be estimated (Table 8).

Table 8. *Rainbow trout brood unit calculation*

# Females	Eggs/Female	Green Eggs	Eye up rate	Total Eyed Eggs
250 – 2 year olds	3,000	750,000	0.70%	525,000
250 – 3 year olds	4,000	1,125,000	0.85%	956,250
Brood Unit Total				**1,481,250**

The 2013 request for eyed rainbow trout eggs in the NFHS is 38.6 million. This is spread over nine unique strains of fish (Table 9). The proportion of the requests by strain are as follows: Erwin/Arlee – 32.5 percent; Arlee – 18.7 percent; Fish Lake – 15.2 percent; Shasta – 13.4 percent; Eagle Lake – 9.3 percent; unspecified – 7.0 percent; McConaughy – 2.6 percent; hybrids – 1.0 percent; Kamloops – 0.2 percent; and Hot Creek – 0.1 percent.

Table 9. *2013 FIS Rainbow Trout Egg Request*

Number	Purpose	Hatchery Type	% by Purpose	Total %
84,000	Broodstock for National Broodstock Program	Hatchery (Federal)	0.22%	
Total	**Broodstock for National Broodstock Program**			**0.22%**
2,300,000	Mitigation - COE	Hatchery (Federal)	5.97%	
1,770,000	Mitigation - COE	Hatchery (State)	4.59%	
5,780,000	Mitigation - Other	Hatchery (Federal)	15.00%	
3,760,000	Mitigation - Other	Hatchery (State)	9.76%	
Total	**Mitigation**			**39.71%**
4,000	Outreach/education	Hatchery (Federal)	0.01%	
40,000	Outreach/education	Hatchery (State)	0.10%	
30,000	Outreach/education	Research Lab - Academia (university, college)	0.08%	
1,250	Outreach/education	School (education, outreach, propagation)	0.003%	
Total	**Outreach/education**			**0.195%**
700,000	Disease-Free Forage	Hatchery (Federal)	1.82%	
Total	**Disease-Free Forage**			**1.82%**
8,325,000	Recreational	Hatchery (State)	21.60%	
400,000	Recreational	Hatchery (Tribal)	1.04%	
150,000	Recreational	Unspecified	0.39%	
Total	**Recreational**			**23.03%**
2,000	Research	Hatchery (Federal)	0.01%	
60,000	Research	Research Lab - Fish Technology Center / FHC	0.16%	
365,000	Research	Research Lab - Other Federal	0.95%	
Total	**Research**			**1.11%**
300,000	Special conservation	Hatchery (State)	0.78%	
10,000	Special conservation	Research Lab - Other Federal	0.03%	
Total	**Special conservation**			**0.80%**
280,000	Tribal trust	Aquarium	0.73%	
918,000	Tribal trust	Hatchery (Federal)	2.38%	
690,000	Tribal trust	Hatchery (Tribal)	1.79%	
431,000	Tribal trust	Unspecified	1.12%	
Total	**Tribal trust**			**6.02%**
5,581,000	Unspecified	Hatchery (Federal)	14.48%	
3,712,000	Unspecified	Hatchery (State)	9.63%	
500,000	Unspecified	Hatchery (Tribal)	1.30%	
Total	**Unspecified**			**27.10%**

Ennis NFH, Erwin NFH, and White Sulphur Springs NFH maintain all of the Service domestic rainbow trout broodstock, and account for all of the Service egg propagation for mitigation rainbow trout being produced nationally. All of the scenarios suggest major reductions to these propagation programs at these three facilities. Erwin NFH is recommended for caretaker status in all five scenarios. The broodstock propagation program at White Sulphur Springs NFH is recommended for elimination in all reduction scenarios and recommended for reprioritization with level funding or a 5 percent increase. Ennis NFH would experience major capacity reduction under each reduction scenario and reprioritization with level funding or a 5 percent increase. Thus it would not be possible to keep these three facilities functioning as a national program under any of the scenarios.

As a result, the Review Team has recommended options for consideration to maintain the Program in light of funding constraints that may be imposed by implementation of any of the scenarios and extensive impacts to partners. In considering these options, it must be recognized that any change to the Program would take a minimum of three to five years to implement. Coordination and planning would be needed with at least 29 states and 16 tribes scheduled to receive eggs from the Program. Adjustment would be required for the Service and many partner agencies as they have planned to receive eggs for propagation, disease-free forage, research, and educational programs for the next three to five years.

In addition, the Review Team recommends that before changes in the Program occur, the National Broodstock Coordinators should be given time to fully evaluate and report on the effects of the options being considered. Coordination with affected partners should be an essential next step if changes are anticipated. The options are based on level funding, and assume that each region would shift from lower priority to higher priority programs, which includes producing trout eggs only for fully cost recovered mitigation programs. The options are focused only on the three rainbow trout broodstock facilities. It should be recognized that any reduction of the Program may cause increased risk of diseases and have negative impacts on genetic variability of the trout strains. Furthermore, any Program reductions may require a focus on fully reimbursed mitigation propagation needs, which would eliminate propagation for states and tribes.

Option 1

Reduce the Program to one rainbow trout broodstock propagation facility (Ennis NFH). Using the brood unit calculations described above, Ennis NFH has the capacity to produce enough eggs for fully reimbursed mitigation demands. An evaluation of strains would be needed to determine which ones to maintain to best meet the requests. A revision of the Service policy on genetic and disease back-up for broodstock would be needed as this option would violate that policy. This option would require the re-allocation of mitigation reimbursement funds from Erwin NFH and White Sulphur Springs NFH to Ennis NFH.

Option 2

Reduce the Program to two rainbow trout broodstock facilities (Ennis NFH and either Erwin NFH or White Sulphur Springs). These two facilities could produce enough eggs for mitigation

requests, and this option maintains genetic and disease requirements associated with the Service's genetic and disease policy. An evaluation of strains would be needed to determine which ones to maintain to best meet the requests. This option would require that mitigation reimbursement funds be distributed between the two remaining hatcheries. Region 4 or Region 5 would need to consider further propagation program reductions depending on which station (Erwin NFH or White Sulphur Springs) remains open.

Option 3

The following option is the Review Team's preferred option. All three rainbow trout broodstock facilities would temporarily remain operational until a phased egg reduction plan could be implemented. The broodstock coordinators would then be able to develop a plan and determine the appropriate number of hatcheries to fulfill egg requests. Egg propagation would likely focus on fully reimbursed mitigation requests. It would be necessary to find $320,000 (the amount needed to keep Erwin NFH open) from an internal source, yet to be determined, to maintain propagation of rainbow trout eggs for fully reimbursed mitigation propagation needs.

In conclusion, any change to the Program would take time to implement. Coordination and planning would be needed with numerous states, tribes, and internally, to ensure needs are being met and operating costs can be achieved under any of the options being considered.

VI. Summary of the Findings and Conclusions

Contributions of the National Fish Hatchery System

The National Fish Hatchery System (NFHS) traces its origins back to 1871. A growing concern for declining fish populations compelled President Ulysses S. Grant to establish the U.S. Fish Commission which eventually became the U.S. Fish and Wildlife Service. Today, the NFHS not only continues to serve its original mission of bolstering our nation's fisheries, it has expanded its mission to include restoration of wild fish and other aquatic species. It is today's NFHS that contributes many extraordinary benefits to the conservation of our nation's aquatic resources. Consisting of 70 fish and other aquatic species propagation hatcheries located across the country, today's NFHS is respected for the quality of its aquaculture. Applying the best available science and over 140 years of continuous experience, the NFHS is recognized for its ability to produce disease free, genetically sound eggs, fry, and adult fish, as well as its ability to propagate and recover other imperiled aquatic organisms. Today's NFHS serves many conservation roles, including:

- Serving as refugia for species nearing extirpation and by helping to recover and restore species federally listed as threatened or endangered, or otherwise at risk.
- Working to restore impaired ecosystems and imperiled populations of aquatic species.
- Fulfilling federal treaty trust obligations to Native American tribes by sustaining and enhancing tribal fisheries and assuring availability of a most valued "first food" for tribes.
- Propagating and releasing millions of warmwater and coldwater fish species, making a significant contribution to recreational, commercial, and tribal fisheries in lakes, streams, and marine environments across the continent.
- Contributing to fisheries, which represent a national economic impact estimated at $903 million annually in industrial output, returning $28 for every federal dollar invested.
- Serving as a mainstay in preserving the social and cultural value of fishing as a recreational, life-enhancing experience for millions of Americans.
- Reducing the intentional or inadvertent taking of imperiled populations, by producing catchable quantities of non-listed fish.

The infrastructure contained within the NFHS has a total asset value of $2.2 billion, and represents complex water control and treatment technologies, as well as aquaculture systems that have value for rearing myriad aquatic species. Facilities are located with access to high quality water supplies, providing federal hatcheries with some of the nation's most valuable water rights. The NFHS possesses great capacity to meet today's fish propagation needs and an equal capacity to meet tomorrow's challenges of species conservation and climate change adaptation.

Funding for the National Fish Hatchery System

The NFHS possesses great potential to meet the future needs of aquatic conservation. However, to meet that potential, it must overcome a number of financial challenges. These challenges began with a FY 2012 operating budget deficit of approximately $2.1 million, with most of this deficit occurring in Region 4. Region 4 operates the largest number of mitigation programs within the NFHS and it is within those programs that the greatest deficit has been experienced.

At current funding levels, whether funded by the Service or by others, continued operation of all existing NFHS propagation programs is not sustainable. With noted exceptions, the NFHS is just able to meet its existing commitments. As previously described, even with a realignment of resources in which some propagation programs are ceased and funds are shifted from lower to higher priority programs, the operation of the NFHS may not be sustainable in the long run. Regular budget adjustments to compensate for inflation are needed to ensure that the NFHS continues to provide its many benefits to the nation's aquatic resources and economy.

Setting Priorities for Propagation Programs

As part of this review, all of the NFHS programs have been classified into categories or subcategories and arrayed in descending order of priority, as described in Section III. The creation of these ranked categories enables the Service to identify which programs are most important to the Service's mission and are a high priority for Service funding. The ranking also identifies those programs not fully supported by reimbursement from other federal agencies and contemplates that those programs should be fully reimbursed or suspended. Finally, the ranking enables the Service to sharpen its focus on the programs supporting recovery, restoration, or non-discretionary tribal propagation programs that represent the Service's highest priorities. This approach will allow the NFHS to manage its responsibilities in an appropriate and business-like fashion by making decisions based on clear criteria and making best use of funds available to deliver the Service's mission.

Staffing of the National Fish Hatchery System

The success and promise of the NFHS lies within its dedicated and skilled employees. An essential component of maximizing efficiency within the NFHS is to ensure that salaries, wages, and benefits are sufficient to meet the staffing requirements for the NFHS propagation goals, while preserving the needed funding for operational expenditures, such as supplies and maintenance. In this review, previous analyses of standard staffing plans were updated. In addition, a target ratio of salaries to other operational costs was established as 65 percent to 35 percent for a typical hatchery. Both the standard staffing plan and the target ratio of salaries to other operational costs must become part of the NFHS business plan and provide guidance for making adjustments to ensure the NFHS is operating efficiently. The review recognizes the need for exceptions to the targeted expenditure ratio based on such factors as age and condition of a hatchery, the complexity of its design, the quality of the water source, the species of fish produced, the age and size to which fish are reared, whether the aquatic species propagated or maintained exist only as refugia populations, and the regulatory environment in which the hatchery operates.

Impacts of Funding Scenarios

As described in earlier sections, a major part of the review identified the needed adjustments the NFHS must make to continue modified operations associated with potential budget scenarios.

Using FY 2012 as a baseline, scenarios were developed at the following levels:

- Level Funding
- 11 percent reduction
- 15 percent reduction
- 24 percent reduction
- 5 percent increase

The review revealed that most Service funding for propagation hatcheries in FY 2012 was focused on the NFHS's highest priorities, as identified by the Review Team. Actual allocations in FY 2012 show nearly 90 percent of Service funding focused on the highest priority propagation programs: recovery of species federally listed as threatened or endangered, restoration of imperiled aquatic species, and meeting tribal trust responsibilities. Non-Service, reimbursable funding primarily supported lower priority programs.

With each of the scenarios, Service funding for lower priority programs was progressively eliminated or decreased and, in some areas, Service funding for higher priority programs increased, such that the focus of NFHS facilities on high priority propagation programs sharpened. With level funding, Service funding within regions would move from lower to higher priority propagation programs. Where appropriate, propagation programs would transition from non-native species to native species. With an 11 percent reduction, Service funding for non-native species propagation other than to meet tribal trust responsibilities would be eliminated. With a 15 or 24 percent reduction, Service funding for native species propagation programs that did not contribute to meeting recovery, restoration, or tribal trust responsibilities would be eliminated. In addition, with a 24 percent reduction, it would be necessary to consider elimination of Service funding to meet tribal trust responsibilities that are not specifically required or covered by law or treaty. With a 5 percent increase, Service funding would move to higher priority programs and programs would transition to propagating species in the higher priority categories just as they would with level funding.

Level funding or a 5 percent increase would sharpen the focus of Service funding on the highest priority propagation programs help improve the condition of facilities, and allow small increases in staffing at some hatcheries. These funding levels would also likely improve the Service's ability to work with partners on efforts that contribute to the recovery and restoration of native species.

The funding reductions considered in this report would require substantial reductions in propagation efforts, with some facilities potentially losing most of their funding. The funding reductions would also likely result in substantial reductions in staffing, with the potential to affect up to 77 positions with a 24 percent reduction. Reductions in Service funding would likely impact recreational, tribal, and commercial fishing opportunities and the economies that benefit from those opportunities.

In addition to the propagation of fish for release into the nation's waters, the National Broodstock Program would be significantly curtailed under most of the reduction scenarios, resulting in adverse consequences for states, tribes, and other partners who are dependent on the high quality eggs produced and supplied by the NFHS. Because of the linkages between the broodstock facilities and other Service hatcheries and because a variety of partners depend on this propagation, it is critical that this part of the review be clearly explained and thoroughly

understood. Since broodstock facilities need to develop a three year plan for the nationwide egg propagation program, the Review Team recommends that any changes made to the National Broodstock Program be phased-in over a three to five year period. Also, under all scenarios, the NFHS would have limited to no capacity to initiate new propagation programs for aquatic species that decline to critical population levels in the future.

All of the potential funding changes, particularly reductions, and the associated changes to facilities and staffing, would take time to implement. Any of the changes considered would require additional planning and would need to be coordinated internally and with partners, including states, tribes, and other affected parties.

Challenges and Next Steps

The NFHS provides immeasurable benefits to aquatic conservation, the economy, and recreation. Moreover, the NFHS, with its unique infrastructure, water resources and scientific expertise, has the potential to offer enhanced benefits in the areas of aquatic species conservation and climate change adaptation. Unfortunately, without a strategic realignment of priorities, existing or slightly enhanced funding for the NFHS will not prevent the rapid erosion of the benefits the system now provides and will certainly foreclose the opportunity to utilize the NFHS for its benefits in the future. This report offers the Service a tool to plan for the future of the NFHS. Working with its state and tribal partners, the Service can create a stronger, more resilient NFHS operating to achieve contemporary Service priorities and meet the fish and aquatic species propagation needs to match those priorities. Specifically, this report offers a tool with which the Service can revise its budget allocation methodologies for the NFHS. In addition, this report provides guidance as the Service continues its discussions with other federal entities, whose mitigation obligations are served by the NFHS, to ensure that those entities fully fund their respective mitigation programs. Stakeholders, partners, and tribes play a key role in managing shared conservation challenges and the Service collaborates with them to conserve and enhance fish and wildlife resources for future generations. With that in mind, the Service notified conservation partners, states and tribes about the review and committed to keep them apprised of the progress. The Service communicated via letters and conference calls, and provided opportunities for follow up.

This report is offered at a key moment in time. Working closely with the Service, the Sport Fishing and Boating Partnership Council is conducting a broad evaluation of the Service's Fisheries Program, which will result in a renewed vision for the Program and ultimately shape its updated strategic plan. A recent realignment of Service programs resulted in creation of a new Fish and Aquatic Conservation Program (FAC) within which the NFHS is firmly established. The intersection of these three events; this report, a renewed strategic plan, and creation of the FAC, the NFHS is well-positioned to meet future challenges for the continued benefit of the American people and the conservation of the Nation's aquatic resources.

VII. List of Appendices

A. National Fish Hatchery System propagation programs by Region, and funding in FY2012
B. FY 2012 National Fish Hatchery System Full-Time Equivalent Positions by Region and Station
C. Total Service hatchery and annual maintenance funding by Region and production type in FY 2012
D. National Fish Hatchery System FY 2012 Funding Totals and Reduction Scenarios
    a. Number of propagation programs by production type and funding in FY 2012
    b. Number of propagation programs by Region, reduction scenario, and funding in FY 2012