

APPENDIX A. RESEARCH AND DEVELOPMENT

FWS Fisheries Program Research and Development Funding (\$000)			
	FY 2006 Enacted	FY 2007 Request	FY 2008 Request
National Fish Hatchery System Subactivity			
Fish Technology Centers (FTC)	6,024	6,321	6,321
FTC's provide leadership in science-based management of trust aquatic resources through the development of new concepts, strategies, and techniques to solve problems in hatchery operations and aquatic resource conservation.			
Fish Health Centers (FHC)	4,061	4,061	3,588
FHC's provides the information needed to insure the health of aquatic species within the ecosystems managed by the Service; Provides fish health biologists with access to training, experience, and a network of highly trained specialists and researchers; Evaluates all aspects of the ecosystem that can alter the health of aquatic animals; Integrates many disciplines to provide comprehensive recommendations to managers; Promotes the health of wild stocks and addresses the effects of hatchery operations on natural fish populations.			
Fish & Wildlife Management Assistance Subactivity			
Conservation Genetics Lab (CGL)	742	731	731
The CGL provides genetic analysis support and expertise to fishery managers for the purpose of conserving genetic resources.			

The FWS Fisheries Program's applied research activities support on-the-ground needs of the Fisheries Program and its partners. New research and technology needs are prioritized in accordance with goals and objectives of the Fisheries Strategic Plan. New initiatives are developed based on an analysis of needs in the Fisheries Operational Needs (FONS) on-line database which provides access to current applied research needs in "real time." Within the Fisheries Information System, applied research needs are linked with the corresponding Strategic Plan Objective, to the broader management plan that calls for the work (such as a Recovery Plan), and to a list of partners in support of the work, collectively establishing relevance for science support activities. Relevance is the first of the three OMB R&D criteria.

While applied research is conducted throughout the Fisheries Program, the seven Fish Technology Centers, nine Fish Health Centers, Conservation Genetics Laboratory, and the Aquatic Animal Drug Approval Partnership (AADAP) program's laboratory, all focus on providing science support to the Fisheries Program. Performance is the second of the three OMB R&D criteria. These facilities contribute directly to several applied research performance measures (e.g., "# of techniques/culture technology tools developed") and indirectly to the balance of Fisheries Program performance measures, by providing fisheries biologists and managers with the necessary science support to successfully manage fishery resources. For example, a collaborative study was completed at Mora Fish Technology Center (NM) that compared the performance of the critically endangered bonytail (fish) when fed various types of commercially available feeds. The goal of the study was to identify a feed that would enhance growth and survival of the bonytail reared for recovery in an intensive culture facility. The study concluded that commercially available diets are largely inadequate for intensive bonytail culture, and provided information for formulating a diet that meets the specific nutritional requirements of the bonytail, thereby potentially improving the success of bonytail propagation programs and the

recovery of this endangered species. The study was published in the North American Journal of Aquaculture, Volume 68.

High quality science, supported by peer review (third OMB R&D criteria) is integral to the Fisheries Program's science support programs. Fisheries personnel on the Service's Science Committee have been involved in efforts to develop publication and peer review standards. Fish Technology Center quality assurance/quality control standards guide all applied research activities. Regular assessment of program quality and relevance is conducted via the Fish Technology Center Evaluation Program. The evaluations not only improve the accountability and quality of programs, but also identify program deficits and areas for improvement. The evaluation process includes external partners, to provide an objective review that demonstrates relevance to the broader fisheries management community.

Fish Technology Centers provide leadership in the scientifically based management of national fishery resources through development of new concepts and techniques to solve specific problems in aquatic restoration and recovery activities. Activities include:

- Development of maintenance and/or propagation techniques and systems for imperiled species;
- Evaluation of hatchery techniques and products;
- Testing alternative cultural practices and assessment techniques to improve the quality and cost effectiveness of hatchery-produced fish;
- Evaluation of effects of pathogens and parasites on wild fish populations.
- Monitoring hatchery effluents and pollution reduction;
- Dissemination of technical information to federal and state agencies and the private sector through scientific journals, professional meetings, and workshops;
- Development of cryopreservation and gene banking technology for native threatened and endangered fish species;
- Development of culture techniques to minimize captive propagation influence on post stocking behavior of native threatened and endangered species; and,
- Development and evaluation of techniques for "streamside" production of native threatened and endangered fishes.

Fish Health Centers provide service, expertise and information that assist in the development of management strategies through assessment and applied research to support the protection of wild stocks and restoration of threatened and endangered species. Comprehensive aquatic animal health requires:

- Monitoring, diagnostics, and inspections of aquatic animals including their physiological and biological characteristics;
- Understanding of the condition, individual requirements, and interactions of wild and cultured fish related to disease and aquatic health;
- Application of diverse scientific fields such as microbiology, fish biology, epidemiology, toxicology, pathology, physiology, histology, and genetics;
- Active representation in management through providing information, risk analysis and management alternatives for decision making; and,
- Education of priority publics about the value of comprehensive fish health in preventing catastrophic losses and improving survivability of aquatic species.

The Conservation Genetics Lab works with biologists and managers to design and conduct genetic research and provide expertise to address conservation and management issues on 16 National Wildlife Refuges in Alaska, and in other Fish and Wildlife Service Regions. Activities include:

- Providing information on the genetic characteristics of fish and other populations required for conserving biodiversity. This includes identifying individual populations, determining how they are related, and grouping them into appropriate management units; and,
- Applying the results of genetics research to the management of important subsistence, commercial and recreational fisheries to determine patterns of migration and run-timing, and the origin of fish harvested in mixed-stock fisheries to protect depleted populations while allowing the harvest of healthy ones.