

## EXECUTIVE SUMMARY

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Howard A. Hanson Dam (HHD) is located at River Mile (RM) 65.0 on the Green River (a major tributary to Puget Sound), in King County, Washington. Put into service in 1962, HHD is a multi-purpose water resource project that was authorized by the Rivers and Harbors Act of 1950 to provide flood protection, irrigation, water supply, and downstream low-flow augmentation. Since 1989, the Seattle District, U.S. Army Corps of Engineers (USACE), in cooperation with the City of Tacoma (Tacoma), has investigated the potential of storing additional water behind HHD for both water supply and ecosystem restoration. The investigation resulted in a Feasibility Study (FS) and Environmental Impact Statement that determined the Additional Water Storage Project (AWSP) is the preferred alternative to help meet municipal and industrial (M&I) water supply needs of the Puget Sound area and the City of Tacoma, in particular, as well as to provide downstream and upstream ecosystem restoration for fish and wildlife in the Green River watershed.

The AWSP would be a dual-purpose water supply and ecosystem restoration project with phased (Phases I and II) implementation. Phase I focuses on the storage of 20,000 acre-feet for M&I water supply and includes the construction of all mitigation and ecosystem restoration features associated with raising the pool by 20 feet to an elevation of 1,167 feet. Phase II will focus on a 10-foot pool raise that will allow for storage of an additional 2,400 acre-feet for M&I water supply and 9,600 acre-feet for low-flow augmentation (LFA). Phase II will include construction of all remaining mitigation and ecosystem features associated with raising the pool elevation to 1,177 feet. Phases I and II combined will serve to store an additional 32,000 acre-feet at HHD.

Habitat restoration and mitigation projects associated with Phase I would include:

- a downstream fish passage facility at HHD;
- re-establishment of sediment and woody debris transport processes downstream of HHD;
- flow adjustments during spring refill to:
  - maximize outflow capacity of the fish passage facility by minimizing the reservoir refill rate during smolt outmigration and potential use of periodic artificial freshets that mimic natural freshets;
  - increase downstream survival of outmigrating salmonids by maintaining a target base flow and provide the option to release periodic freshets during peak outmigration;
  - partially mitigate downstream effects of storage by maintaining a target base flow that improves side channel and lateral mainstem rearing habitats;
  - provide adequate baseflows through the steelhead incubation period that protect eggs deposited during higher spawning flows;
  - annual storage of an additional 5,000 ac-ft (Section 1135 Storage) for low-flow augmentation;

- management of riparian forests to maintain forest succession on major streams above HHD (such management would occur in Tacoma's Natural, Conservation, and Commercial Forest Management zones);
- reconnection of approximately 3.4 acres of side-channel habitat to the mainstem lower Green River;
- habitat rehabilitation including large woody debris (LWD) placement and excavation or reconnection of off-channel habitats to selected streams between the elevations of 1,177 feet and 1,240 feet;
- return of the river to its historic channel between RM 83.0 and 84.0 using one or more debris jams/flow deflectors;
- maintenance of instream and riparian corridor habitat within the reservoir inundation zone (elevation 1,147 feet to 1,167 feet);
- maintenance of stream and riparian corridor habitat in lower Page Mill Creek, creation of a series of new, smaller ponds, and addition of woody debris to the ponds and stream channel;
- replacement of culverts that constitute barriers to upstream or downstream fish passage in tributaries to the Green River (locations to be identified from a culvert inventory);
- improvement of habitat in the mainstem Green River below HHD by constructing engineered log-jams and limited excavation to recreate meanders or backwater habitats;
- wildlife habitat mitigation including: 1) creation of elk forage habitat; 2) upland forest management to promote late-successional and old-growth forest habitat conditions; and 3) wetland and riparian habitat improvements in the reservoir inundation zone (elevation 1,147 feet to 1,167 feet) including construction of sub-impoundments and sedge plantings over 60 acres;
- annual release of 3,900 cubic yards of gravel in the lower Green River; and
- transport and/or placement of woody debris (collected in HHD reservoir) in the lower Green River.

This Conceptual Design Report documents the evaluation of 43 habitat sites comprised of two major groupings: 1) fish restoration/mitigation and 2) wildlife mitigation. Of the 43 sites, 20 were fish, 17 were wildlife, and 6 were joint sites. Subjects addressed in each site evaluation are: purpose of habitat project design, existing conditions, ecological criteria and considerations, hydrologic and hydraulic considerations, description of alternatives, basis for selection of proposed action, tasks/disciplines for 65% level design, anticipated operation and maintenance activities, and Phase I mitigation measures. Site photos and site plans are also provided, where available. Selection of the proposed actions resulted from site visits and collaborative consultations involving scientists and engineers from the USACE, Tacoma, resource agencies, and the consultant team.

The designs for fish habitat restoration and mitigation for 9 mainstem sites and 11 tributary sites are presented in the fish habitat section of this report. Below HHD, in the Kanasket-Palmer reach of the mainstem (sites GN-KP, MSI-01, MSI-02, MSI-03 on RM 59 to RM 60.5), habitat

enhancement opportunities include gravel nourishment, large woody debris introduction, mainstem jam complexes and restoration of Signani Slough. Within the reservoir, log booms and floating woody debris islands are proposed enhancements. Above HHD, mainstem habitat enhancement measures are recommended at three adjacent sites (MSI-04, MSI-05, MSI-06) spanning from RM 69.5 to RM 82. Integrated design components in these reaches include water tolerant plantings, large woody debris jams, sub-impoundments, bar apex jams, meander jams, barb jams, mainstem river jam complexes, large woody debris placement, woody debris reintroduction, riparian forest management, and large boulder/clusters placement. Habitat enhancements are also proposed on the tributaries including the North Fork Green River, Page Mill Pond, Charley Creek, Cottonwood Creek, Piling Creek, and Gale Creek. Tributary improvements include riparian forest management, water tolerant plantings, large woody debris and boulder/cluster placement, and the creation of tributary jam complexes. Replacement of culverts to allow upstream fish passage is also proposed on Boundary Creek (RM 68.5), Maywood Creek (RM 76.5) and Green Canyon Creek (RM79.1).

The wildlife mitigation sites include three habitat types: managed pasture, forest management, and emergent marsh/sub-impoundment. The mitigation target acreages for the three habitat types were 79, 143, and 69, respectively. During the numerous development steps of the evaluation, several iterations of design were made to both the boundaries and components of each site. The resulting conceptual design for each site reflects the interactive nature of this project and the goal of achieving the mitigation target acreages. The proposed wildlife actions, if implemented, will result in 87.21 acres, 161.00 acres, and 69.82 acres of managed pasture, forest management, and emergent marsh/sub-impoundment creation, respectively. These totals meet, or exceed, the mitigation objectives designed to offset the impacts associated with Phase I of the AWSP.

The viability of the proposed fish and wildlife measures will be confirmed by the sixty five percent level design, continued consultation, and the regulatory process.