Fiscal Year 2018 Hanford Natural Resource Damage Assessment

Activity and Accomplishment Report

Summary

This report provides a summary of the Hanford Natural Resource Damage Assessment (NRDA) activities and accomplishments during Fiscal Year 2018 (FY2018). The Hanford Natural Resource Trustee Council ("HNRTC" or "Trustee Council") - composed of the State of Oregon, State of Washington, Nez Perce Tribe, Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation, the U.S. Fish and Wildlife Service, NOAA Fisheries, and the U.S. Department of Energy – is implementing the NRDA process at Hanford. This report is organized around three main natural resource categories and the related services provided by those resources: terrestrial, aquatic, and groundwater.

The Trustee Council obligated more than $1M of funding this year for initiating or completing groundwater, Tribal, aquatic, and terrestrial studies.

Project teams delivered project materials or technical updates for eight assessment activities: (1) groundwater vadose and non-use evaluations, (2) 100-F area assessment, (3) injury thresholds, (4) chinook salmon modeling, (5) terrestrial disturbance, (6) information to help establish aquatic baseline and structure the aquatic assessment, (7) shrub-steppe habitat restoration planning, and (8) aquatic data compilation.

Work in FY2018 focused on continuing the FY2017 injury assessment studies, and began work on 4 new studies: (1) aquifer storage and retention evaluation, (2) aquatic and terrestrial data visualization, (3) terrestrial data compilation, and (4) Phase III 100 F area evaluation.

The Trustee Council continued to meet on a monthly basis to manage progress on these studies and to plan, organize, implement, and direct Hanford NRDA activities. All of the Trustee Council project teams are a curating their draft and final technical study-specific products in a data management system (Project Portal). The Trustee Council's goal is to complete the injury assessment and prepare a Restoration Plan by 2024.

Injury and Service Loss Studies

At of the close of FY2018, the following injury studies were at various stages of completion:

Injury Thresholds for Soil, Sediment, and Water

This project is developing Hanford-specific injury thresholds for contaminants of concern in soil, sediment, and surface water. Using the methodologies agreed upon by the Trustee Council in FY2016, two contractors are writing technical memos that establish the scientific basis for threshold selection. The Trustee Council continued its contract with Oregon State University to determine thresholds for inorganics. Trustees started a new contract with Freestone Environmental for the development of thresholds for organic and radiological constituents. With 2 contractors (OSU and Freestone) on board the Trustee Council accomplished the following in FY2018:

- Finalized memos for manganese, mercury, zinc, antimony, copper, cadmium, boron, and barium
- Trustees planned and attended workshops on radiological and organic threshold development and provided feedback on methodology
- Developed methodologies for establishing thresholds for radionuclides and organic constituents
- Updated the companion methods document that explains the theories, methods, and assumptions used in developing thresholds.

Threshold development is slated to be completed by the summer of 2019. Freestone Environmental was also tasked with researching and recommending approaches for service loss and methods for approaching contaminant mixtures, which they will complete in FY2019.

Terrestrial Disturbance (Study 18)

During FY2018 the Terrestrial Disturbance Project Team, in coordination with contractors from Freestone Environmental, continued to advance the quantification of various disturbances across the entire Hanford Site. The project team utilized GIS data layers from both the Waste Information Data System (WIDS) and cleanup verification packages, as well as aerial imagery, to categorize and quantify habitat disturbances created by Hanford operations and cleanup activities. The categories of disturbances, quantified in acres, will establish a range of injuries to terrestrial habitats that will form, in part, the basis for a habitat equivalency analysis and potential restoration projects. Freestone completed an updated Draft Terrestrial Disturbance Inventory Report dated August 2018 which quantified disturbances across all 100 Areas, 300 Area, 200 Area Inner/Outer Area and the IU2/IU6 Area.

The Terrestrial Disturbance Study is now at a critical stage where input from a Legal Work Group is necessary to perform meaningful quantification and analysis for compensable NRDA injuries. Legal topics for a Legal Work Group may include determination of terrestrial baseline, what types of disturbances are compensable under NRDA and how best to address the temporal component of injury quantification across the disturbed areas. A Legal Work Group will be forming in FY2019. Additional quantifications will also continue in FY2019 for (1) total disturbance footprint caused by installation of wells (monitoring and remedial) across Hanford and (2) future disturbances resulting from future Records of Decision (RODS) and future cleanup actions.

Terrestrial Habitat Restoration Planning (Study 18b)

The Study 18b team worked on the second of two phases of shrub-steppe restoration planning, having completed phase 1 in FY2017. The team planned and carried out a two-day expert panel with shrub-steppe experts from Washington and Oregon. The purpose of the panel was to fill information gaps identified in phase 1 and to get information on shrub-steppe habitat conditions, services, post-restoration recovery rates and factors that influence those rates, and restoration best practices. The panel was a significant undertaking that involved the following:

- Selection of experts to participate in the panel
- Communication with experts before and after the panel
- Determining the panel agenda and creating work products for the experts to respond to
- Setting up panel logistics (e.g., handouts, visual aids, facilitation team, facility setup)
- Writing up a summary report of the panel findings.

The expert panel was held in February 2018 and was attended by Trustees and DOE contractors. After the panel, the Study 18b team wrote a panel summary and distributed it to the experts and Trustees for

comment. This summary was finalized and voted on as a complete work product by the Trustee Council in early FY2019 and it will be used to make future recommendations for restoration crediting.

Institutional Controls Inventory (Study 38)

The purpose of Study 38 was to determine the extent to which institutional controls (ICs) at the Hanford site are related to the release of hazardous contaminants. The study defined the temporal and geographic scope and nature of these controls and described the types of human uses that may be impacted. The final report on the study was completed and approved by the Trustee Council in June 2018, and uploaded into Project Portal. The associated GIS data was cleared and also uploaded into Project Portal.

The report identified a couple of key issues that warrant review by the Legal Work Group. These include the description of baseline relative to the ICs, the timeframe for lost services associated with the ICs, and how to account for future ICs expected with the ongoing cleanup on the Central Plateau.

Aquatic Data Compilation

The first phase (1 of 3) of the aquatic data compilation project was completed by Alta Science & Engineering, Inc. at the end of FY2018. The purpose of this work was to compile and review analytical data for their utility, quality, and relevance to injury assessment questions. Completion of Phase 1 resulted in the compilation and review of 19 data packages (or data utility assessments) and represents all significant analytical data sets available for the Columbia River which are related to the Hanford Site (up to 400 kcfs). Other relevant data such as the Surface Environmental Surveillance Project data were also included in the data package compilation and review. Provisional data packages and corresponding citations for phase 1 were uploaded and archived to the Project Portal.

The second and third phases of the Aquatic Data Compilation project were also initiated in FY2018 and are led by Freestone Environmental Services, Inc. The objective of Phase 2 of this work is to address the formal acquisition process to search for, obtain, or extract original sources of analytical data; including GIS layers, project metadata, maps, images, and other information, that will require any form of manipulation and configuration management to be submitted to the Project Portal. The development and implementation of data acquisition protocols provided a standardized and streamlined approach for documenting and tracking the data acquisition process and resulted in revisions to the HNRTC Data Acquisition Plan. Phase 3 of this project focuses on submitting the acquired data and information into the HNRTC Case User Library within Project Portal. This work and process is ongoing and is scheduled to be completed in FY2019.

Aquatic Species Habitat Mapping (Part of Study 46 and 51)

As part of the work contracted for Phase 1 of the Aquatic Data Compilation Project, Alta Science & Engineering, Inc. is also mapping fish habitat for species-life stage combinations for sculpin, pacific lamprey, and white sturgeon at various flow levels for the Hanford Reach of the Columbia River. This work created habitat suitability models in ArcGIS by incorporating data layers of species life-stage variables for geologic substrate, river depth and velocity. Model results generated specific habitat suitability maps for incremental river flows ranging from 40 kcfs to 400 kcfs depicting where suitable habitat may exist for specified life stages. The data layers and resulting habitat suitability maps were uploaded and archived to the Project Portal. Additional hard copy products were generated for the Trustee Council.

Chinook Salmon Modeling

The Chinook Salmon modeling study started in second quarter FY2018 and continued throughout the year. The purpose of this study is to model mortality scenarios to assess the potential level of impact that hexavalent chromium upwelling to the Columbia River could have on the Hanford Reach fall Chinook salmon population. Acute and chronic scenarios were developed to utilize multiple years of recorded

spawning data to model the measureable decline in productivity that may occur for a given scenario. The temporal time period of the study is from the time CERCLA was enacted (December 1980) to present day, with annual time steps.

The study is based on an existing stock-recruit model developed to evaluate the effects of Priest Rapids Dam operations on the freshwater productivity of the Hanford Reach fall Chinook salmon population. The model was modified so it could be used to apply various mortality scenarios for the purpose of estimating the percent reduction in annual egg-to-presmolt survival and the corresponding reduction in freshwater productivity.

The Trustee Council has received a report related to freshwater survival and salmon productivity based on 1% reductions in annual egg-to-presmolt survival for Hanford Reach fall Chinook salmon. Overall, results of the 1% study indicated there was not a significant impact in freshwater productivity for any of the time periods tested. Additional modeling scenarios are in process, and the project is targeted for completion in FY2019.

Groundwater (Study 36)

This study is a sub-set of groundwater studies that the Trustee Council has listed in the Project Execution Plan and Injury Assessment Plan. By consensus vote the Washington State Department of Ecology (Ecology) was designated as the lead for the study.

Groundwater study 36 was initiated in Phases beginning in 2014, and is intended to describe the services provided by groundwater under baseline conditions at Hanford and how services may have been adversely impacted by contaminants under a "no release" scenario. The 3rd Phase of the study begins evaluating the baseline services described in Phase II portion of the study: (1) aquifer storage and retention, (2) non-use, and (3) tribal services provided by groundwater under baseline conditions at Hanford.

For FY2018:

- Ecology presented a comprehensive white paper to Trustee Council that discussed the baseline services, uncertainties, and further study needs.
- Trustees discussed:
    - Application of present and future contaminated groundwater volume to service loss
    - The scale of appropriate restoration projects to restore or replace lost services
    - Quantity of groundwater available for use in acre-feet per year following Washington State's regulatory framework given land use appropriations listed under the federal land use component
    - Federal policy framework on land use and how the federal government releases excess land
    - Federal land policies, quantity of available groundwater, and baseline services.

FY2018 accomplishments/results:

- Ecology personnel developed scopes of work and contracted with Oregon State University to perform work surrounding aquifer storage and retention.
- Ecology prepared a final white paper explaining the State's position on Federal Reserved water rights. All Trustee organizations reviewed and provided comments on the white paper.
- Ecology presented discussion points for project teams on both non-use and vadose zone services. Discussion are to continue at the Trustee Council on both of these services.

Tribal Lost Service (TLS) Studies

The three Hanford Tribal trustees [Yakama Nation (YN), Nez Perce (NPT) and Confederated Tribes of the Umatilla Indian Reservation (CTUIR)] have each continued studies to determine the nature and extent of potential impacts of Hanford releases on the cultural services provided to tribal communities by natural resources. These services may have been diminished in quality or interrupted by the presence of contaminants released by Hanford Operations.

Yakama Nation

Not available

Nez Perce Tribe

The NPT Tribal Service Loss study was completed at the end of FY2018 with no additional costs. The project reviewed and catalogued over 7,000 documents, and interviewed individuals, both elders and people knowledgeable of the Hanford Site. Other relevant interviews conducted in the past were screened and catalogued. All interviews are transcribed for use by the Principal Investigator (PI). The PI completed a draft anthropological report on the injury to the Tribe's cultural practices due to releases at Hanford. The draft report will be used to develop a restoration plan and alternatives.

Confederated Tribes of the Umatilla Indian Reservation

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) continued their 100-F Tribal Lost Services study in FY2018 by implementing Phase 2 of this project. During FY2018, CTUIR's Trustee Council representatives received a Traditional Use Report from the CTUIR Department of Natural Resources Cultural Resources Protection Program. This Traditional Use Report provides information on First Foods resources potentially available in the 100-F area, with a focus on botanical resources, as well as additional cultural resource information related to Sahaptian place names, historic villages, trade networks and trails, and other archeological information. The report developed in Phase 2 will be used in conjunction with the on-line mapping tool created in Phase 1 of the 100-F project in order to display information relevant to the injury assessment and so is a continuation of the effort to evaluate the lost use of human services provided by the natural resources at Hanford that is due to the release of contamination. As cleanup is completed at other reactor areas along the Columbia River, the CTUIR intends to replicate the methodology being developed for the 100-F Tribal Lost Services project and apply it using site-specific data for each area.

Much of the information gathered as part of the Traditional Use Report from Phase 2 is highly confidential and therefore not releasable to the public. However, information about Sahaptian place names of the CTUIR is available in *Čáw Pawá Láakni (They Are Not Forgotten): Sahaptian Place Names Atlas of the Cayuse, Umatilla, and Walla Walla* (Eugene S. Hunn, E. Thomas Morning Owl, Phil E. Cash, Cash, & Jennifer Karson Engum). This atlas provides a description of traditional place names and the associated tribal uses of various portions of the Hanford Site, including the 100-F area, as well as many other locations within the aboriginal homelands of the people of the CTUIR.

Project Management

This element includes staffing for the Trustee Council, project coordination, and project management oversight. The Trustees generally met on a monthly basis in FY2018 to plan and oversee Hanford NRDA activities. A key Trustee Council objective for FY2018 was to fund and make substantial progress on injury studies focused on analysis of existing data. Current year funding/costs were reviewed on a routine basis.

Matthew Johnson (CTUIR) was Chair of the Trustee Council for FY2018 and, Wanda Elliott (Washington) was vice-chair. For FY2019, Wanda Elliott (Washington) will serve as Chair and Jack Bell (NPT) will be Vice Chair.

Information and Data Management

The goal of the information and data management effort is to maintain a working and defensible database for the injury assessment process. The intent of this activity is to implement, operate and maintain a data management system (Project Portal) as outlined in the Data Management Plan approved by the Trustees. This includes: (1) implementing, operating and maintaining the Project Portal and (2) providing the following functions: data management; document management; GIS and non-GIS data stewardship; quality assurance and data access coordination.

The Trustee Council continued its contract with MSA to provide the Project Portal services through its subcontractor, ddms, in FY2018. The Trustee Council also maintains a contract with Freestone Environmental Inc. for a Data Manager/Quality Assurance Coordinator position. During FY2018 the Data Manager assisted project leaders and contractors with import and export of data from the Project Portal along with acquisition of data from outside sources. Notable accomplishments included:

- Assisting project leaders in setting up customized file structure;
- Compiling data summaries for non-process areas, aquatic media, reference sites, thresholds development, and historical sampling of Hanford Reach National Monument Lands; and
- Facilitating acquisition of historical imagery and geospatial files for use in Disturbance Inventory quantification.