ODFW Carbon Reduction Plan (2022)

The mission of the Oregon Department of Fish and Wildlife is to protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations.

Background

The Oregon Department of Fish and Wildlife's (ODFW) Climate and Ocean Change Policy (Oregon Administrative Rule (OAR) 635-900-0007) directed the agency to develop a carbon reduction plan that outlined how the department would reduce its own net greenhouse gas emissions, with the goal of being carbon neutral by mid-century, through the construction, purchasing, and use of energy-efficient facilities, structures, vehicles, and equipment, and by managing department owned lands to sequester carbon. This required an assessment of ODFW's: a) approximately 70 campuses with one or more facilities on site, which include office buildings, storage buildings, research centers, fish hatchery facilities, maintenance shops, and ODFW-owned housing; b) vehicle and equipment use; and c) ecosystem types on managed lands.

The Climate and Ocean Change Policy also directed the agency to assess its carbon footprint every five years or less. ODFW's Base Year Greenhouse Gas Inventory Report (ODFW GHG Report) was finalized in 2021, which assessed the carbon footprint of ODFW operations from July 1, 2019 – June 30, 2020. The inventory was prepared in accordance with The Greenhouse Gas Protocol for the U.S. Public Sector, and identified and assessed Scope 1 (i.e., emissions that occur from sources within the organizational boundary) and Scope 2 (i.e., emissions from the consumption of electricity purchased by ODFW) sources of greenhouse gas emissions for the agency (Table 1). ODFW's total greenhouse gas emissions were calculated as 9,280 tonnes of equivalent carbon dioxide (CO_2e) per year from:

- Electricity consumption
- Fuel combustion of vehicles
- Fuel combustion of equipment and boats
- Fuel combustion of heating ventilation and air conditioning systems
- Fugitive emissions from refrigerant use in facilities and vehicles, and
- Emissions from fish production.

The ODFW GHG Report (2021) also assessed carbon sequestration in the approximately 200,000 acres of lands managed by ODFW and determined that the emissions from the agency's operations are already being offset by carbon sequestration on our managed lands. The estimated carbon sequestration in ODFW's wildlife areas is equivalent to almost 61,000 tonnes of CO_2e per year, which is over 6.5 times larger than our base year GHG emissions total (i.e., 9,280 CO_2e). Therefore, the agency has already met the goal of being carbon neutral, but recognizes the need to lead by example and continue to identify resources and implement actions that reduce carbon emissions and increase carbon sequestration as practicable.

The ODFW Carbon Reduction Plan outlined below will help the agency to meet the requirements of the ODFW Climate and Ocean Change Policy, as well as the State of Oregon's Executive Orders (EO) 20-04 [Directing State Agencies to Take Actions to Reduce and Regulate Greenhouse Gas Emissions], EO 17-20 [Accelerating Efficiency in Oregon's Built Environment to Reduce Greenhouse Gas Emissions and Address Climate Change], and 17-21 [Accelerating Zero Emission Vehicle Adoption in Oregon to Reduce Greenhouse Gas Emissions and Address Climate Change], Oregon Revised Statues (ORS) 276.915 [State Agency Facility Energy Design], ORS 184.421-435 [Sustainability Act], ORS 468A [Air Quality], the Oregon Sustainability Board's Sustainability Plan Guidelines, and other regulatory directives.

Goals and Actions for Reducing Greenhouse Gas Emissions
The carbon reduction goals were developed to specifically address the agency's greenhouse gas emission sources identified in the ODFW GHG Report (2021), as well as to improve the agency's sustainability practices and proactively manage sequestered carbon. Each goal identifies specific actions and targets that will assist the agency to achieve the overarching goal of reducing ODFW's carbon footprint. Paralleling the carbon reduction goals with the ODFW GHG Report (2021) metrics will assist the agency in tracking the outcomes of our efforts to reduce greenhouse gas emissions and re-evaluating our targets and efforts as needed.

ODFW will work to implement the following goals and actions to reduce the agency's carbon footprint to the extent practicable.

Goal 1: Reduce the Department's Electricity Use
Consumption of purchased electricity at ODFW campuses was the agency's highest greenhouse gas emission source. Installing *energy star* rated (or equivalent) equipment as described in Oregon's Energy Efficient Equipment Purchasing Standards document, incorporating renewable energy sources at ODFW facilities, and conducting other maintenance and upgrades to promote energy efficiency will assist in decreasing the agency's electricity use.

Action 1.1: Replace lights that are "on" more than three hours per day with light emitting diodes (LEDs) in all facilities, wherever feasible. Bulbs should be *energy star* rated or equivalent. Lighting upgrades should be made when existing bulbs burn out or existing lighting sources need replacement. Where practical, facility lights should be proactively switched to energy efficient models utilizing grants and rebate programs where time and budgets allow. For all new construction, incorporate LED lighting into facility design.
Target: Convert ten agency owned office buildings, including headquarters and hatchery facilities, to full LED lighting by 2030. Twenty by 2040.

Action 1.2: Incorporate renewable energy into all building construction projects valued at $1,000,000 or more. Total value of renewable energy infrastructure constructed under this section should be at minimum, 2% of the total price of construction. Current state statutes (ORS 279C.527) require that green energy concepts be incorporated into public building construction greater than $5,000,000 at a value of 1.5% of the total cost. The above thresholds will help to put ODFW on a quicker path towards sustainability. In addition, ODFW will proactively seek out funding to retro fit existing buildings with renewable energy. Where practicable, when designing for solar or renewable energy incorporation into an existing facility/campus, staff should utilize the facility's historical energy consumption as a production target for the renewable energy facility design (Example: If the Clackamas District Office Campus has a yearly energy consumption of 1,000 kilowatt hours, the target energy production of the renewable energy facility should be 1,000 kilowatt hours). Reaching this targeted amount may not be feasible or cost effective in all scenarios, but this target should serve as a starting point for renewable energy facility development.
Target: Incorporate renewable energy sources at five agency campuses by 2030. Fifteen by 2040.

Action 1.3: Install *energy star* certified heating ventilation and air conditioning (HVAC) systems at ODFW facilities. Incorporate energy efficient HVAC systems for all new construction, and when existing HVAC systems need to be replaced.
Target: Incorporate energy efficient HVAC into all new construction designs by 2023. Install HVAC equipment with the highest efficiency energy *star rated equipment for heating and cooling. For existing HVAC systems, utilize Facility Condition Assessments (FCA) to prioritize low efficiency HVAC systems for replacement. Replace all fossil fuel-based HVAC equipment with the highest efficiency* energy *star rated equipment for heating and cooling by 2040. When replacing HVAC equipment, inspect air duct systems and update/replace to SMACNA and ASHRAE standards.*

Action 1.4: Identify and/or prioritize campuses purchasing electricity from utilities with high emission factors and determine if lower emission sources of electricity are available.

Action 1.5: Replace large pumps, such as pumps used for diverting water, with high efficiency pumps that include variable frequency drives and/or other energy efficient technology.
Target: Continue to replace, construct, or otherwise install pump facilities that include energy efficient designs, such as the inclusion of variable frequency drives, at all agency pumping facilities.

Action 1.6: Evaluate ODFW Hatcheries and Wildlife areas that have surface water rights for micro hydroelectric system suitability. Micro-hydro power generating systems are small turbines that can be placed in pipes, irrigation canals, or other similar "off-channel" conduits to produce power and offset facility energy consumption. Proactively install micro-hydroelectric systems at all locations where practical, focusing on locations with the highest power generation versus cost ratios.
Target: Develop a list of campuses where micro-hydro is feasible and develop/install one micro-hydro unit at one campus every five years. Complete installation at all applicable campuses by 2040.

Action 1.7: Continue to identify and prioritize building maintenance and upgrades to promote energy efficiency through FCA reports. Utilize FCAs to prioritize repairs, modifications, or replacement of buildings with structural components (e.g., roofs, doors, windows) rated as "poor."
Target: Replace/modify all components listed as "poor" on the FCA by 2035 with energy star rated components. For all new construction, incorporate energy star certified components such as roofs, windows, walls, entryways, etc., to ensure efficient use of energy. For both new construction and replacement projects, components and features used in buildings (e.g., roofs, walls, windows, doors, flooring) should utilize insulation R factors recommended by energy star for the facilities climatic zone to ensure high energy efficiency.

Action 1.8: Continue to manage energy consumption at ODFW campuses by managing plug loads and operating buildings per the DAS Statewide Energy and Resource Conservation Policy.

Goal 2: Reduce the Department's Vehicle Fuel Combustion
ODFW operates a fleet of over 1,000 vehicles including passenger cars, light- and heavy-duty trucks, and fish liberation trucks. Greenhouse gases are emitted from the combustion of fuels in ODFW on-road vehicles, including E-10 gasoline, gasoline, B5 biodiesel, diesel, E-85 gasoline, and propane (in descending order). Mobile fuel combustion represents over half of the agency's Scope 1 greenhouse gas emissions. Conversion to lower-emitting categories of vehicle fuel and incorporation of hybrid and electric vehicles (EV) consistent with the DAS Statewide Fleet Policy will reduce the amount of vehicle fuel combustion by ODFW.

Action 2.1: All new incoming fleet sedans and SUVs should be hybrid or EV vehicles, if available from motor pool, starting 2023.
Target: All fleet sedans and SUVs are hybrid or electric by 2030.

Action 2.2: Incorporate fully electric light duty trucks into the agency fleet as vehicles become available.
Target: Replace ten gas or diesel light duty trucks with fully electric light duty trucks by 2030. Continue to incorporate fully electric trucks into the agency fleet to replace fossil fuel powered trucks, as practicable and/or as available from motor pool.

Action 2.3: Incorporate bio-diesel or renewable diesel (R99) into agency operations as applicable. Utilize bio-diesel or R99 diesel in all ODFW operations and campuses where applicable. Where ODFW has bulk diesel storage tanks, procure bio-diesel or R99 diesel through statewide price agreement to fill tanks and use in daily operations.

Action 2.4: Replace older fish liberation trucks and heavy-duty trucks with newer more fuel-efficient models. Incorporate fully electric fish liberation trucks into the agency fleet as EV technology becomes more readily available. Proactively seek out grants to help fund purchases of fully electric fish liberation trucks and heavy-duty trucks where feasible.
Target: Replace gas or diesel liberation trucks and heavy-duty trucks with fully electric models, where feasible, at a rate of one every five years.

Action 2.5: Make strategic investments to upgrade ODFW campuses to include EV charging stations. *Target: Install EV charging stations at Salem headquarters by 2025, and at all feasible watershed offices by 2030. Have EV charging stations at 35 (approximately 50%) of ODFW campuses by 2040.*

Action 2.6: Utilize virtual and hybrid meeting spaces to conduct meetings when feasible and appropriate. Allow for virtual participation and/or attendance when feasible. For "repeat" meetings (e.g., meetings that are conducted on a regular basis throughout the year such as Commission Meetings, Executive Leadership Team Meetings, Resource Management Team Meetings, Fish and Wildlife Team Meetings, volunteer board meetings, and task force meetings), schedule at least one meeting during the year to be held virtually, and others with a hybrid attendance option.

Goal 3: Reduce the Department's Equipment and Boats Fuel Combustion

Greenhouse gases are emitted from the combustion of fuels in ODFW boats, generators, water pumps, and earth-moving and landscaping equipment, including B5 biodiesel, E-10 gasoline, diesel, gasoline, and kerosene. Conversion to lower-emitting categories of fuel and incorporation of electric powered equipment will reduce the amount of ODFW's fuel combustion using off-road equipment and boats.

Action 3.1: As heavy equipment, such as tractors, back hoes, and other equipment need to be replaced, acquire equipment that utilizes bio-diesel or R99 diesel for fuel. Make strategic investments at remote field stations to install bio-diesel/R99 diesel tanks, and procure bio diesel or R99 diesel to fill bulk fuel tanks used for fueling equipment.

Action 3.2: Identify inefficient and aging generators with heavy use at ODFW facilities. When generators need to be replaced, replace the generator with a high efficiency generator, such as models that utilize lower carbon emitting fuel such as bio-diesel, R99 diesel, propane, and natural gas.

Action 3.3: Assess the potential for incorporating electric powered propulsion systems in ODFW boats where practicable. Consider electric powered propulsion systems when purchasing new boats or motors.

Action 3.4: Purchase or promote electric or battery powered landscaping equipment for use on ODFW campuses when practicable.

Goal 4: Reduce the Department's Heating and Cooling Fuel Combustion

Greenhouse gas is emitted from the combustion of natural gas and propane for space heating at nineteen ODFW buildings. Installing *energy star* certified equipment and making structural improvements will reduce the amount of heating and cooling fuel combustion by ODFW.

Action 4.1: Install *energy star* certified heating ventilation and air conditioning (HVAC) systems at ODFW facilities. Incorporate energy efficient HVAC systems for all new construction, and when existing HVAC systems need to be replaced.
Target: Incorporate energy efficient HVAC into all new construction designs by 2023. Install HVAC equipment with the highest efficiency energy star rated equipment for heating and cooling. For existing HVAC systems, utilize FCAs to prioritize low efficiency HVAC systems for replacement. Replace all fossil fuel-based HVAC equipment with the highest efficient energy star rated equipment for heating and cooling by 2040. When replacing HVAC equipment, inspect air duct systems and update/replace to SMACNA and ASHRAE standards. For all new construction, incorporate energy star certified components such as roofs, windows, walls, entryways, etc., to ensure efficient use of energy.

Action 4.2: Determine structural improvements (e.g., weatherproof windows and doors, improve insulation, etc.) to reduce heating and cooling loss at ODFW facilities. For all new construction and replacement/renovation, incorporate *energy star* certified components such as roofs, windows, walls, entryways, etc., to ensure efficient use of energy. Components and features of buildings (e.g., roofs, walls, windows, doors, flooring) should utilize insulation R factors recommended by *energy star* for the facilities climatic zone to ensure energy efficiency.

Action 4.3: Install high efficiency (*energy star* rated or equivalent) water heaters, such as electric resistance or heat pump water heaters at ODFW facilities.
Target: For all new construction, incorporate high efficiency electric resistance or heat pump water heaters beginning in 2023. Replace existing fossil fuel-based water heaters with high efficiency electric resistance or heat pump water heaters by 2040.

Goal 5: Reduce the Department's Fugitive Emissions
Fugitive greenhouse gases are emitted when refrigerants are lost from refrigeration and air conditioning systems in ODFW campuses and vehicles. Conducting annual inspections and maintenance will ensure fugitive emissions are reduced to the extent possible.

Action 5.1: Develop a complete list of currently operating refrigeration and air conditions systems and assess the types of refrigerants used for all ODFW needs to improve the accuracy of greenhouse gas emission calculations.

Action 5.2: Hire Environmental Protection Act (EPA) certified technicians when possible to perform annual maintenance to ensure all refrigeration systems are functioning properly and do not leak refrigerant.

Action 5.3: Make proactive investments to refrigeration systems by replacing aging and outdated systems with new, eco-friendly and energy efficient systems. Eliminate refrigeration systems if not necessary for the operation of the facility.
Target: Replace all refrigeration units greater than 35 years old by 2030, and all units greater than 25 years old by 2040. Decommission unessential refrigeration and freezer units where practical at fish hatcheries by 2030.

Action 5.4: Ensure all HVAC systems are inspected annually starting 2023 to ensure units run efficiently and do not leak refrigerant. Consistent with goals 1 and 4, replace HVAC units with energy efficient models as appropriate.

Action 5.5: Inspect and maintain cooling systems on all ODFW owned vehicles at the manufacturer recommend intervals. Ensure systems are operating properly and that there are no coolant leaks. Ensure heating and air conditioning systems are serviced by a qualified technician in accordance with the recommendations in the vehicle's user manual.

Goal 6: Reduce the Department's Nitrous Oxide Emissions (hatchery production)
Process greenhouse gases are emitted as nitrous oxide (N_2O) from microbial nitrification and denitrification processes as a result of fish production in fish hatchery facilities. However, there is a high level of uncertainty in the calculations of this emission source due to limited research and supportive documentation in the field of study. N_2O emissions were modeled rather than measured in the ODFW GHG Report (2021). Additional research is required to identify and implement potential solutions for reducing the department's N_2O emissions.

Action 6.1: Conduct investigations on potential sources of N_2O in ODFW fish hatchery facilities. Deploy N_2O sensors at abatement ponds, raceway, feeding facilities, and/or other waste area systems.
Target: Deploy N_2O at a minimum of three locations by 2025.

Action 6.2: Conduct research to more accurately estimate the N_2O that is produced in ODFW fish hatchery facilities, including studies on potential sources of N_2O such as uneaten fish feed and fish waste.

Action 6.3: Using the data collected from the actions above, identify and implement potential solutions for reduction of N_2O emissions at ODFW fish hatchery facilities. Incorporate solutions, along with specific targets, into future updates of the ODFW Carbon Reduction Plan.

Goal 7: Incorporate Sustainable Practices into ODFW Building and Business Development, Operations, and Maintenance

The following actions do not directly relate to the Scope 1 and 2 greenhouse gas emissions reported in the ODFW GHG Report (2021); however, they address additional carbon reduction practices ODFW can implement to reduce the agency's carbon footprint.

Action 7.1: Incorporate Leadership in Energy and Environmental Design (LEED) elements into construction when practicable. For all new ODFW building construction, buildings should be carbon neutral ready and should be constructed 20% more efficient than code following Oregon Department of Energy's State Energy Efficient Design (SEED) requirements. New building construction includes replacement of existing buildings and new stand-alone building construction. For all major building replacements or upgrades, incorporate LEED elements as practicable. This includes building construction projects valued at $500,000 or greater, or when 25% or more of an existing building's structure and components are replaced.
Target: Pursue improvements to five facilities/buildings consistent with LEED certification by 2030, fifteen by 2040.

Action 7.2: Reduce the agency's paper use. Evaluate current agency paper processes and where practicable, move to fully digital processes to eliminate use of paper products. Digitize existing paper files, and recycle old paper files as needed, while still meeting records retention schedules. Create plans and strategies for digitizing any remaining processes that are still occurring with paper.
Target: Move all manual paper process to digital for processing and storage, where possible, by 2030.

Action 7.3: Create a 'Green Team' of interested staff to identify and implement opportunities to reduce the agency's carbon footprint in ODFW's building and business operations, and assist with implementing actions at ODFW campuses statewide. Tasks will include evaluation and improvement of recycling, composting, and other eco-friendly programs at ODFW campuses statewide.
Target: Initiate a 'Green Team' by 2024.

Goal 8: Maintain Carbon Sequestration in ODFW's Wildlife Areas

Vegetated ecosystems store a significant amount of carbon in the living biomass of the vegetation, debris, and soil. The approximately 200,000 acres of wildlife and recreation lands managed by ODFW sequester approximately 61,000 tonnes of CO_2e per year, which is over 6.5 times larger than ODFW's greenhouse gas emissions total per year (2019-2020). ODFW Wildlife Areas are managed for a variety of purposes, including fish, wildlife, and habitat conservation, and providing wildlife-oriented recreational and educational opportunities to the public. Wildlife area management plans identify the purpose, goals, and management actions for each site, and will consider carbon sequestration in future management decisions.

Action 8.1: Maintain the same amount of vegetated land in ODFW Wildlife Areas and increase the number of acres where and when practicable. Enhance carbon sequestration through habitat restoration management where consistent with wildlife area management plans.

Action 8.2: Restore ODFW Wildlife Areas after vegetated land has changed due to fire impacts and other disturbances consistent with wildlife area management plans. Manage habitat in ODFW Wildlife Areas to increase resiliency to fire and other disturbances and incorporate carbon sequestration in post-disturbance restoration decisions consistent with wildlife area management plans.

Action 8.3: Include carbon sequestration as one of the factors informing vegetation and soil management when updating wildlife area management plans.

Action 8.4: Incorporate carbon sequestration into the decision framework when considering acquisition of new ODFW properties.