City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	May 19, 2021
From:	Peter Russell Director, Sustainability and District Energy	**File:**	10-6150-00/Vol 01
	Milton Chan, P.Eng Director, Engineering		
Re:	**Habitat Enhancement Opportunities for Dike Improvement Projects**		

Staff Recommendation:

1. That, as described in the staff report titled 'Habitat Enhancement Opportunities for Dike Improvement Projects', dated May 19, 2021, from the Director, Sustainability and District Energy and Director, Engineering:

   a. An agreement with the Department of Fisheries and Oceans Canada to establish a Fish Habitat Bank be endorsed;

   b. A public communication plan and stakeholder consultation program be developed; and

   c. The impacts to service levels and the capacity of existing resources to absorb these activities be monitored and should there be a need for additional staffing resources, staff submit the request for consideration in the annual budget process.

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Att. 1

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Finance	☑	
Policy Planning	☑	
Parks Services	☑	
SENIOR STAFF REPORT REVIEW	**INITIALS:**	**APPROVED BY CAO**

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Staff Report

Origin

This report outlines the federal framework for fish habitat banking in BC and identifies opportunities to acquire fish habitat credits to offset anticipated habitat impacts related to capital projects. Anticipated habitat impacts relate mainly to dike raising projects.

Related to the above, during the June 20, 2018 Public Works and Transportation Committee meeting, staff received the following referral:

"That staff use the Terra Nova model to explore opportunities to receive credits towards releasing of habitat compensation requirements on future projects, and report back."

This report supports Council's Strategic Plan 2018-2022 Strategy #1 A Safe and Resilient City:

> *Enhance and protect the safety and well-being of Richmond.*

This report supports Council's Strategic Plan 2018-2022 Strategy #2 A Sustainable and Environmentally Conscious City:

> *Environmentally conscious decision-making that demonstrates leadership in implementing innovative, sustainable practices and supports the City's unique biodiversity and island ecology.*
>
> *2.1 Continued leadership in addressing climate change and promoting circular economic principles.*

Analysis

Habitat Offsetting under the Federal *Fisheries Act*

The protection of fish and fish habitat is regulated by the federal Department of Fisheries and Oceans Canada (DFO), pursuant to the federal *Fisheries Act*. DFO assesses most activities occurring in or near water to determine risks related to various activities. Fish habitat includes water frequented by fish and any other areas that fish depend on for life processes such as spawning, rearing, food supply and migration. A hierarchy of measures to avoid potential impacts and mitigation measures are used to reduce impacts through project design. When unavoidable impacts remain, following avoidance and mitigation, DFO requires additional measures such as habitat offsetting, to reduce the overall loss of fish habitat due to development.

Fish habitat banking was established federally by DFO in the 1980s as a tool for fish habitat offsetting. The concept, now legislated under the *Fisheries Act*, allows proponents to acquire *credit*, in the form of *area*, by creating or improving fish habitat that can be banked to offset impacts in advance of future projects, such as diking improvements. An agreement between DFO and the proponent is required that outlines the terms and conditions of the fish habitat bank, including how the bank will be implemented and jointly managed. Many fish habitat banks have been created in BC (and Canada), ranging from ongoing, well-established restoration programs to smaller, single-sourced projects needed to offset an immediate project need.

Fraser River Estuary and Richmond's Ecological Network

Over two-thirds of BC's population lives in the Fraser River basin and 54% of that population is situated in the Lower Mainland. Historical land uses such as land reclamation, agriculture, and diking have altered the form and function of the Fraser River and its estuary. It is estimated that over 70% of the historical wetlands in the Fraser River estuary have been diked, drained and/or filled.

The City's Ecological Network, first articulated in the City's 2041 Official Community Plan in 2012, was developed in response to the aforementioned concerns and impacts. The Ecological Network is the inter-connected system of natural and semi-natural areas across Richmond, including terrestrial, riparian and marine (shoreline and intertidal), encompassing both public and private lands. The City's *Ecological Network Management Strategy* was endorsed by Council in 2015 and provides an opportunistic framework for managing land (sites, hubs and corridors) within the City's jurisdiction or through development. Richmond's Riparian Management Area Network and the Fraser River foreshore are corridors in the Ecological Network that provide linkages between hubs and facilitate the movement of species, water and nutrients to the Fraser River. The City's Riparian Management Area Network is comprised of channelized watercourses and sloughs that have setbacks on minor (5 metre) and major (15 metre) features. Residential, commercial and industrial development is subject to setbacks in these areas. While the Fraser River's bed and banks are provincially-owned, the City's foreshore is designated as an Environmentally Sensitive Area in the Official Community Plan. Private developments proposed in these areas require City review and potential authorization through a Development Permit. Eighty percent of the Ecological Network is located on private property, in the Agricultural Land Reserve, within the dike footprint or on provincial land.

Richmond's Flood Management Strategy

Richmond's diking system changed the physical characteristics of the landscape and allowed for permanent settlers on Lulu Island. The earliest dikes in Richmond, constructed of earth, were low and unstable. To reinforce these early dikes, excavating machines were used in the late-1940s to gather denser materials adjacent to existing dikes to create taller, more stable dikes. This method was a more efficient and economical means to enhance flood protection but also resulted in the formation of wider and deeper drainage canals adjacent to dikes. Non-pervious dikes have been constructed since the 1970s based on improved provincial standards. New standards under the provincial Dike Design and Construction Guidelines now discourage constructed features on the landside of dikes, such as channelized watercourses, because they can lead to seepage and slope stability concerns. Many of the channelized watercourses created through this process are now within the City's Riparian Management Area network and are subject to federal and provincial regulatory requirements for proposed works at or near their boundaries due to the riparian habitats that have thrived along the watercourses.

The Council endorsed *2019 Richmond Flood Protection Strategy* identifies the perimeter dike system as the primary flood protection system to protect the community against climate change induced sea level rise, the freshet and seasonal flooding. The current strategy identifies raising the dikes in advance of 2100 to a minimum dike crest elevation of 4.7 metres over a newly updated 50-year timeframe, which would protect the City against the conservative projections for a one metre sea level rise and 0.2 metre of land subsidence. Accelerating the dike upgrade

program will provide additional flood resilience for the City by raising the dikes well in advance of the current sea level rise projections used by the City for modelling. Dike Master Plan Phases 1, 2, 3, and 5 have been endorsed and Dike Master Plan Phase 4, focusing on the North Dike, is under consideration.

Flood protection maintenance works and upgrades, include raising dikes are required and will impact the City's Ecological Network. Dike improvements require an expanded footprint when constructed and provincial design standards discourage large channelized watercourses adjacent to dikes. Only smaller stormwater collection features such as the minor ditches resulting from the dike improvements on the South Dike (between No. 3 Road and Dike Road) are recommended to handle local overland flows. The proposed dike footprint in each planning phase has been conceptually designed to avoid high-value fish habitat along the Fraser River. Where it cannot be avoided, a loss of existing riparian and freshwater aquatic habitat, through the infill of Riparian Management Area on the land side, is anticipated. In addition, a significant portion of the Phase 4 study area is designated as an Environmentally Sensitive Area forming a part of the City's Ecological Network. The need to raise the dikes and fill these areas will trigger provincial and federal permitting requirements that include offsetting for the loss of habitat.

Habitat Impacts Associated with Dike Improvements

Most dike improvement projects (and dike maintenance activities) are currently subject to federal and provincial regulations and in some cases, the City has been required to offset past dike improvement works, either onsite or in other locations, in Richmond. Notwithstanding habitat negotiated through private development, the City has completed approximately 8 hectares of fish habitat enhancement required to offset project impacts. Enhancements have included the marsh benches near the Olympic Oval, the riparian habitat at the Woodward Slough and various pump station upgrades.

Similarly, proposed dike configurations within the City's Dike Master Plan are expected to impact existing fish habitat within the conceptual footprint as work progresses. The Dike Master Plan covers the entire island and in some cases, the existing dike lies beneath roads, such as River Road. Channelized watercourses, with 5 and 15 metre setbacks, often parallel the land-side toe of the road. It is estimated that the City will be required to offset approximately 15 hectares of riparian habitat to complete just the proposed Dike Master Plan 4 improvements. Land use adjacent to the dike in this area is generally a mixture of agricultural, light industrial, parkland, and low density residential. A considerable amount of riparian and aquatic habitat is expected to be affected by construction in this area as the dike footprint expands into the channelized watercourse. Significant habitat impacts like this are another reason why the provincial design standards now recommend against large channelized watercourses along dikes. The proposed land-side impact is preferred because the City's channelized watercourses generally provide lower quality fish habitat compared to the Fraser River. Dike expansion and existing land use restrictions such as private ownership present a challenge to offset these future impacts. Three scenarios are currently acceptable under the *Fisheries Act*, including:

- No Net Loss Project-Specific Measures – This approach offsets impacts to fish habitat on a project-by-project basis to target a *no net loss* of fish habitat onsite and is the typical method currently used by the City. This approach is generally accommodated through the capital planning process but requires higher offset ratios (e.g. 3:1 habitat area

replacement) and extended monitoring programs following construction. When using this option, it is also more difficult to find suitable land for enhancement if land is not available at or near the site of disturbance, which has led to some inefficiencies for staff when trying to plan overall restoration works;

- Net Gain Project-Specific Measures – This approach offsets impacts to fish and fish habitat on a project-by-project basis to target a *net gain* of habitat by creating additional fish habitat onsite that may be carried forward as credit to offset future project impacts. This approach is more difficult to coordinate with the City's capital planning process as it requires DFO's pre-approval (which can not be reliable), and additional City-owned land in the project footprint, to create or restore fish habitat. This option is susceptible to project permitting delays and is considered a less measured approach to enhancement planning; and

- A Fish Habitat Bank – A fish habitat bank can reduce the burden of the large-scale offsetting measures required for future diking projects and improve local habitat value to fish in a measured approach. DFO classifies offsetting projects as either habitat restoration and enhancement or habitat creation under the *Fisheries Act*. Potential project opportunities can be further defined by scope, habitat type and land tenure, the quality of existing habitat, and partnerships. Attachment 1 provides additional information related to qualifying offsetting projects in a fish habitat bank. A habitat agreement can take considerable time to establish. Successful habitat banks are reliant on the availability of land and an effective stakeholder and Indigenous consultation program as recommended. This option also requires a reliable funding source as most senior government funding opportunities are not available for habitat credit projects.

While the first two scenarios are always available to the City, establishing a Fish Habitat Bank best suits the needs of the City because it offers a consistent and reliable permitting arrangement to support the City's future offsetting requirements and can be deployed strategically to strengthen and build the City's Ecological Network. This proposed arrangement is also expected to satisfy provincial permitting requirements and can build on the information gathered from previous enhancement projects and existing projects such as the sediment nourishment project proposed on Sturgeon Banks and the ongoing South Arm Jetty Breaches. The City also has an advantage as a landowner over other organizations leading fish habitat banks in the region. Many organizations must actively seek suitable locations in the Lower Fraser. This has lead to a highly competitive market, while the City can rely on the land within and near its municipal boundaries.

Next Steps

Work is currently underway as part of the City's Flood Protection Management Strategy to carryout regular maintenance and upgrades to the City's 49 kilometres of existing dikes. Staff recommend pursuing a fish habitat bank agreement to meet the City's future habitat offsetting needs that will allow for a measured approach to habitat enhancement with the City's Ecological Network. If endorsed, staff will begin to negotiate an agreement with DFO, through the regulated process, and define the future terms and conditions of the City's offsetting projects. Part of these negotiations will require the City to prepare a proposal document outlining possible project sites and developing key partnerships with local stakeholders such as Metro Vancouver and local Indigenous Groups. Information gathered from engagement can also be used to better understand

species distribution in the Ecological Network and support future environmental policy work including updates to the City's *Ecological Network Management Strategy*. Staff will also begin developing a public communication plan and stakeholder consultation program, including Indigenous Groups, which is required to support the management of a bank. As an agreement is being negotiated, the City will be required to utilize the other two options to support obtaining project permits under the *Fisheries Act*. If endorsed, a fish habitat agreement will not preclude the City from using other offsetting measures to address future impacts, should it be more practical to do so.

The City will not be permitted to begin receiving credits until an agreement has been jointly negotiated with DFO and projects are fully completed. Negotiations are expected to be lengthy and it may take years to finalize the terms and begin constructing projects. Priority would be given to identifying areas on City-owned land, such as Terra Nova Park, but dedicated funding will be required for planning purposes. The City currently completes habitat enhancement for diking upgrades on a project by project basis. These are primarily funded through the Drainage and Diking Utility and senior government grant funding as part of the Council approved Capital Budget. Staff will prepare a capital project submission for consideration in future budget processes that will benefit future diking projects. If endorsed, future projects, outside of the proposed dike footprint or not on city-owned land, may be presented to Council in the form of closed reports due to the ongoing competition for projects in the Lower Fraser.

Funding options for projects that accrue credits are limited, so staff intend to pursue partnership opportunities, where possible, to reduce the overall cost needed to support habitat projects. Staff do note that some of these costs will be (indirectly) offset by the successful and ongoing pursuit of flood management funding obtained from senior governments.

Staff Resources

Staff expect to handle the additional work associated with the early stages of negotiating a fish habitat bank agreement within existing staffing resources. Additional staff resources are expected to manage the fish habitat bank, if endorsed and prior to a final agreement with DFO to plan, evaluate and consult on prospective (future) projects. Staff intend to monitor the DFO negotiations as it relates to the capacity of existing resources. Should there be a need for additional staffing resources, staff will submit the request for consideration through the annual budget process for Council's consideration.

Financial Impact

None at this time. Should Council endorse the recommended fish habitat bank arrangement with DFO, staff will prepare submissions to be considered through the annual budget process.

Conclusion

The City has immediate and future needs to maintain and upgrade its dikes as part of its overall flood management strategy. Current and future works, required to protect the community, will have unavoidable impacts on existing riparian and aquatic habitat along the landside of the dike. Existing environmental legislation under the federal *Fisheries Act* requires that unavoidable impacts to fish and fish habitat be offset. The Department of Fisheries and Oceans Canada

provides a method for proponents to arrange a formal fish habitat bank that would allow the City to accrue credits that can be used towards future dike improvement projects. If endorsed, staff will begin early negotiations with the Department of Fisheries and Oceans Canada, develop public and stakeholder consultation plans, including Indigenous Groups, and monitor this service level change for possible staffing shortfalls as the work progresses.

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Att. 1: Suitable Types of Fish Habitat Enhancement Projects

Suitable Types of Fish Habitat Enhancement Projects

A summary of suitable types of fish habitat enhancement projects and a brief description of each is tabulated below.

Riparian Habitat Enhancement	This project type includes control or removal of invasive plants and revegetation with native riparian plants. Riparian enhancement may involve planting dike slopes or constructing riparian benches at or above high-water levels.
Marsh Bench	This project type enhances existing shoreline habitat through establishment of an intertidal marsh composed of native emergent vegetation (e.g. mudflats).
Fringe Tidal Marsh	This project type involves the restoration of tidal marsh on the river-side of the dike. Tidal marsh restoration can also integrate tidal channel excavation to increase habitat value for fish and wildlife usage and structural complexity.
Sediment Accretion	This project type involves installation of in-stream structures to promote sediment accretion such as barrier islands, based on ambient hydrodynamic processes.
Sediment Nourishment	This project type would mainly apply to Sturgeon Bank and will involve addition of a sediment source.
Aquatic Off-channel Habitat	This project involves creation of additional off-channel habitat vital for juvenile salmon and white sturgeon rearing.
Industrial Reclamation	This project type involves conversion of industrial lands to functional habitat. This includes restoration of hardened and contaminated surfaces to functional intertidal and riparian habitat.
Restore Orphaned Compensation Sites	This project type targets old compensation sites that are no longer being maintained and now require restoration and enhancement.
Offshore Barrier Islands	This project type targets exposed offshore areas (e.g. tidal flats) where the creation of barrier islands may offer protection to shorelines from storm surges.