

A Species at Risk Act Section 11
Conservation Agreement to support
the recovery of the southern resident
killer whale

Annual report

Period 4: May 2022 – May 2023



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Purpose of this report

The purpose of this annual report is to summarize progress and findings related to recovery measures undertaken during Period 4 (May 2022 to May 2023) of the five-year [*Species at Risk Act Section 11 Conservation Agreement to Support the Recovery of the Southern Resident Killer Whale*](#) (the “Conservation Agreement” or “agreement”).

As outlined in section 7.4 of the agreement, each year (period) the parties to the agreement will evaluate the completed actions and propose additional commitments to increase the likelihood of achieving reductions to acoustic and physical disturbance from large commercial vessels to support the recovery of southern resident killer whales.

The Vancouver Fraser Port Authority is the lead author of this report with review and input provided by the Enhancing Cetacean Habitat and Observation (ECHO) Program’s advisory working group and Conservation Agreement management committee.

Acknowledgements

The ECHO Program and the parties to the Conservation Agreement would like to recognize the members of the ECHO Program’s advisory working group, vessel operators committee, acoustic technical committee and all other partners for their advice and support in the planning and implementation of the commitments and recovery measures of the agreement. For a full list of advisors and partners, please see the ECHO Program [webpage](#).

Parties to the Conservation Agreement



Fisheries and Oceans
Canada
Pêches et Océans
Canada



Background

The ECHO Program

The Enhancing Cetacean Habitat and Observation (ECHO) Program is a collaborative regional initiative led by the Vancouver Fraser Port Authority and guided by the input and advice of government agencies, the marine transportation industry, Indigenous advisors and environmental organizations.

The ECHO Program was launched by the port authority in 2014 to better understand and reduce the cumulative impacts of shipping activities on at-risk whales throughout the southern coast of British Columbia, with the long-term goal of quantifiably reducing threats to whales as a result of shipping activities.



The ECHO Program's advisory working group, vessel operators committee, and acoustic technical committee assist the ECHO Program team in identifying research, educational, and threat reduction initiatives that best meet the program's goals and objectives, while taking a wide range of cultural, economic, and environmental factors into account.

With the support of the ECHO Program's many partners and advisors, the program has facilitated the design and implementation of numerous voluntary underwater noise reduction measures, focused primarily on reducing acoustic disturbances caused by large commercial vessels within key foraging areas of southern resident killer whales (SRKW) critical habitat.

In addition to coordinating large-scale underwater noise reduction efforts, the ECHO Program spearheads international research and education efforts to broaden understanding of ship-generated underwater noise and inform the development of underwater noise reduction solutions.

Conservation Agreement

On May 10, 2019, the Minister of Fisheries, Oceans and the Canadian Coast Guard entered into a five-year agreement with the Vancouver Fraser Port Authority and eight other parties, entitled [Species at Risk Act Section 11 Conservation Agreement to Support the Recovery of the Southern Resident Killer Whale](#).

The agreement formalizes the participation of the parties in the ECHO Program, a regional collaborative initiative focused on reducing threats to at-risk whales from commercial shipping, with a focus on endangered southern resident killer whales. Through this agreement, the port authority and other signatories commit to continue working collaboratively over a five-year term to advance threat reduction measures to support the recovery of southern resident killer whales.

The agreement outlines each party's commitment to the continuation of existing efforts and measures and the development of new voluntary threat reduction and research measures, to be implemented and applied in both the short and long term. These measures are described in detail in Appendix A of the agreement.

The nine parties to the agreement ('the parties') are, in alphabetical order:

1. Chamber of Shipping
2. Council of Marine Carriers
3. Cruise Lines International Association – North West & Canada
4. Fisheries and Oceans Canada
5. International Ship-Owners Alliance of Canada
6. Pacific Pilotage Authority

7. Shipping Federation of Canada
8. Transport Canada
9. Vancouver Fraser Port Authority

Appendix A of the Conservation Agreement highlights five key focus areas which support southern resident killer whale recovery:

- A. Regional engagement and collaborative efforts
- B. International engagement and collaborative efforts
- C. Data collection and research
- D. Initiatives to reduce underwater noise from large commercial vessels
- E. Initiatives to reduce physical disturbance from large commercial vessels

Under these five key focus areas, Appendix A outlines 25 measures, that required action in Period 4, which refers to the timeframe between June 2022 to May 2023. One measure did not require action in Period 4 and is therefore not included.

Conservation Agreement management committee

In accordance with Section 6.1 of the agreement, the parties established a committee (the Conservation Agreement management committee) to oversee the implementation and effectiveness of the agreement and to provide a collaborative forum to discuss and resolve any issues that may arise over the term of the agreement.

In May 2022, the Conservation Agreement management committee and members of the advisory working group met to provide input into the development of the Period 4 conservation agreement measures. In July 2022, the conservation agreement committee met again to finalize the Period 4 measures and the Conservation Agreement Period 3 annual report.

Role of port authority and ECHO Program advisory working group

As outlined in section 5.2.1 of the agreement, the Vancouver Fraser Port Authority has committed to continuing to manage the ECHO Program. This includes supporting the engagement of the Conservation Agreement parties and other ECHO Program participants.

In particular, the ECHO Program's advisory working group plays a key role in supporting the development and implementation of annual work plans to meet the goals of the agreement. In Period 4, the ECHO Program met with the advisory working group five times to share updates on annual measures, track progress on key performance indicators and seek input on measures requiring attention.

Monitoring and reporting

As described in Section 7 of the agreement, as part of the ECHO Program's annual planning process, a monitoring and assessment framework was developed and implemented to facilitate measurement of progress on measures identified in Appendix A of the Conservation Agreement.

Clear targets, metrics, and timelines were assigned to each measure, as well as designated lead parties and associated contacts responsible for reporting on the progress of measures. Key performance indicators (KPIs) and associated targets were developed for evaluating the effectiveness of the Conservation Agreement as a whole over the duration of the agreement.

The following sections and Appendix 1 of this report summarize the status of the agreement's Period 4 measures and commitments, as well as key performance indicators.

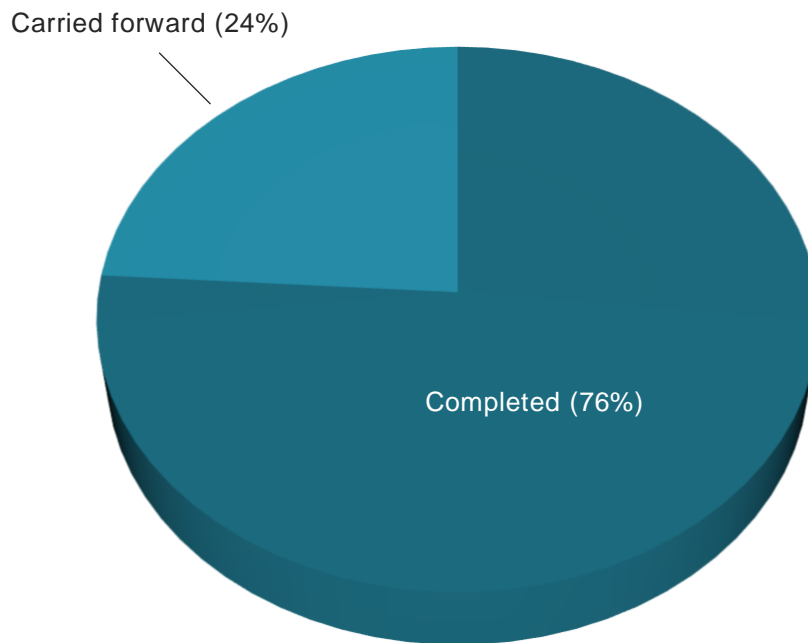
Period 4 highlights

Measure implementation status

Of the 25 measures that required action in Period 4, 19 measures (76%) are complete, and 6 measures (24%) will be carried forward into Period 5 of the agreement. Figure 1 shows the status of Period 4 measures.

All measures and sub-measures that required action in Period 4 are outlined in Appendix 1 of this report and grouped into one of the five key focus areas (Area A to E) identified as supporting southern resident killer whale recovery.

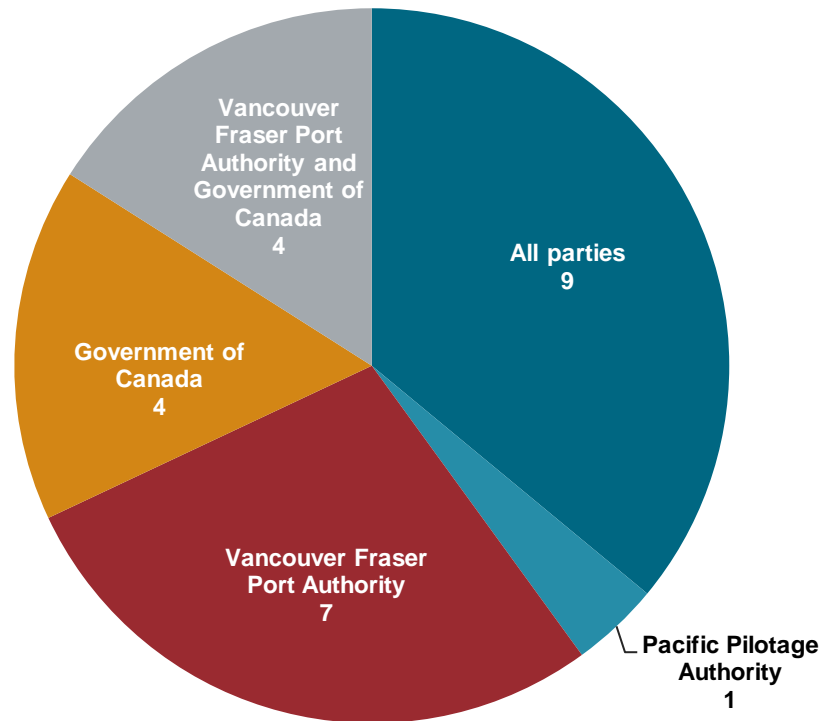
Figure 1: Summary of Period 4 measures status



Parties leading Period 4 measures

All 25 measures applicable in Period 4 were assigned to a lead party responsible for implementation. Figure 2 shows the breakdown of the parties leading Period 4 measures.

Figure 2: Parties leading Period 4 measures



Measuring overall Conservation Agreement effectiveness

The ECHO Program team, advisory working group, and Conservation Agreement management committee have developed key performance indicators (KPIs) to evaluate the effectiveness of the Conservation Agreement over the duration of the agreement, focusing on its effectiveness at supporting the recovery of the southern resident killer whale.

Through the lens of adaptive management and continuous improvement, the ECHO Program team and its advisors set annual KPI goals. These goals are refined, as appropriate, through a process of continuous evaluation and reflection on achievement. Clear explanations and justifications for why any goals were unmet, modified or adapted are discussed with the CA management committee and program advisors based on what has been learned.

The thirteen goals set for the KPIs in Period 4 are described in Table 1. Each KPI and associated goals fall into one of the three categories of desired outcomes, which are closely aligned with the intent of the Conservation Agreement:

Conservation Agreement Desired Outcome 1 (KPI 1.1 - 1.3)

ECHO Program advisory working group (AWG) members and other regional interests continue to remain engaged, informed and working together to implement measures which quantifiably reduce threats to SRKW from large commercial vessels through integrated consideration of biological, cultural, economic and safety impacts and benefits.

Conservation Agreement Desired Outcome 2 (KPI 2.1 - 2.3)

Quantifiable reduction in threats from large commercial vessels are measured and/or modelled in key areas of SRKW critical habitat as a result of threat reduction initiatives implemented through the Conservation Agreement.

Conservation Agreement Desired Outcome 3 (KPI 3.1 - 3.2)

National and international awareness about the need to reduce underwater noise from vessels is growing, and the number of ports with quiet vessel incentive programs, as well as vessels with quiet design, technologies and/or notations is increasing.

Period 4 KPI performance

In Period 4, all thirteen goals were achieved towards fulfilment of the Conservation Agreement's eight KPIs, as outlined in Table 1. This strong achievement of KPI goals is a positive indication of the continued overall effectiveness of the agreement in Period 4.

Notably, for KPI 1.2. regarding vessel participation rates, parties vastly exceeded their participation goals by achieving all-time-high participation rates of 93% in the Haro Strait and Boundary Pass slowdown and 97% in the Strait of Juan de Fuca lateral displacement.

For KPI 2.1, regarding the quantifiable reduction in threats to whales from large commercial vessels, all three of the underwater noise reduction goals were achieved, with underwater sound intensity reduced by nearly 50% in key areas.

For KPI 2.3. regarding the advancement of research projects, the ECHO Program completed a [co-benefits study](#) which found that the program's slowdowns could reduce whale strike risk by nearly one-third.

A full overview of each KPI's performance in Period 4 is available at Table 1. For additional information on the ECHO Program's Period 4 activities, please see the [2022 ECHO Program annual report](#). For full reports on each of the ECHO Program's voluntary initiatives, please visit the [ECHO Program website](#).



Photo: Jeanne Hyde

Table 1: Conservation Agreement key performance indicators (KPI) for Period 4

KPI	KPI description	Period 4 goals	Period 4 achieved
1.1	Maintain effective engagement of advisory working group (AWG) members: 75% of AWG members (or alternates) attend ECHO Program AWG meetings and AWG meeting evaluations score a minimum average 4 out of 5 ranking, reflecting a high level of satisfaction with respect to the meeting quality.	75% attendance	81%
		Average 4 out of 5 score on meeting evaluation forms	✓
1.2	Maintain or improve commercial vessel participation rates: Vessel participation rates meet or exceed the participation goals for threat reduction initiatives (such as the Haro Strait and Boundary Pass (H/B) slowdowns and Strait of Juan de Fuca lateral displacement (SJDF LD)) set by the ECHO Program AWG each year.	Meet or exceed vessel participation goal: H/B slowdown 90% SJDF LD 85% Swiftsure Bank (SB) outbound slowdown 80% SB inbound slowdown no goal	H/B – 93% ✓ SJDF – 97% ✓ SB – outbound 81% ✓ SB – inbound 83% ¹
1.3	Regional commercial mariners actively use whale awareness and educational tools: The ECHO Program undertakes at least 4 promotional activities per year to actively communicate with regional commercial mariners to encourage their ongoing use of available whale awareness and educational tools.	Four promotional activities	✓
2.1	Maintain or improve ambient noise reduction levels: Underwater noise reduction initiatives in SRKW critical habitat (such as slowdowns and lateral displacement trials) meet or exceed the ambient noise reduction goals set by the ECHO Program AWG each year.	Reduce ambient underwater noise levels in key SRKW foraging areas: H/B slowdown 3 dB SJDF LD n/a ³ SB outbound slowdown 2 dB SB inbound slowdown no goal	Haro and Boundary slowdown: 2.7 and 2.8 dB ² ✓✓ SJDF LD: 4 - 7 dB per transit ³ ✓ SB outbound ~3.1dB ✓ SB inbound ~2.2 dB
2.2	Decrease affected SRKW foraging time: For threat reduction initiatives (such as slowdowns and lateral displacement trials) in areas where behavioral response modelling exists, decrease the amount of time SRKW foraging may be affected by vessel noise, to meet or exceed the goals set by the ECHO Program AWG each year.	Reduce affected foraging time in Haro Strait by an estimate of ~20%	✓
2.3	Explore new threat reduction measures: The ECHO Program advances at least one new research project annually intended to reduce underwater noise or physical disturbance threats from large commercial vessels in SRKW critical habitat.	One new research project annually: Advance research studies to better understand co-benefits of the ECHO Program's voluntary seasonal slowdowns of Large Commercial Vessels	✓
3.1	Encourage application of quiet vessel design and technology: The Government of Canada, supported by the ECHO Program, convenes and/or participates in at least five meetings/initiatives per year with IMO member states, ship classification societies, ship owners, technical experts and industry experts to encourage consistency in, and uptake of, quiet vessel notations and application of quiet vessel design and technology internationally.	Five meetings/initiatives with international stakeholders	✓
3.2	Increase uptake of quiet vessel incentive programs: The Government of Canada, supported by the ECHO Program, engages with at least four Canadian port authorities and/or international ports per year to advise on the implementation of quiet vessel incentive programs, with a view to catalyzing an increase in the total number of ports that offer quiet vessel incentive programs annually.	Engage 4+ ports	✓

Notes:

- ✓ Indicates the achieved rate met or exceeded the goal
- 1. Although no goal was set for 2022, achieved 83% participation rate for Swiftsure Bank inbound slowdown
- 2. Haro-Boundary slowdown noise reduction measured at 2.7 and 2.8 dB, considered meeting target
- 3. 4-7 dB reduction in noise achieved for each participating transit

Challenges and reflections

Overall, in Period 4 of the Conservation Agreement, the ECHO Program achieved 76% of the 25 measures it set out to complete. Notably, the ECHO Program exceeded the goals it set for key performance indicators related to voluntary participation, achieving an all-time-high participation rate record of 86% across its three voluntary threat reduction measures. These achievements speak to the enduring effectiveness of the Conservation Agreement and collaborative spirit of its parties.

While all 25 of the Conservation Agreement measures were meaningfully advanced during Period 4, six measures will be carried forward into the next period due to unanticipated delays related to resourcing and technical complexities. In Period 5, the ECHO Program will continue to advance these measures in collaboration with signatories of the agreement, with the goal of completing all measures before the end of the next period.

Of note, the measurement and evaluation of underwater noise remains an area for further investigation, due in part to changing baseline levels of underwater noise in the program's slowdown areas. Considering this, the ECHO Program will continue to work with its partners and advisors to explore opportunities to refine the processes used to measure and evaluate underwater noise, and where necessary, make adjustments to applicable KPIs.

Looking ahead

The ECHO Program team was pleased to hear the positive sentiments expressed by Conservation Agreement committee members in July 2023 regarding the effectiveness of the agreement and the desire for further collaboration. The ECHO Program team is confident that the program will continue to quantifiably reduce threats to at-risk whales throughout Period 5 of the agreement.

Beyond Period 5, the ECHO Program team plans to engage with agreement signatories to advance the renewal of a new, five-year term for the Conservation Agreement to support the recovery of endangered southern resident killer whales. Towards this goal, the ECHO Program will continue to actively engage with and seek input from partners and signatories on additional threat reduction measures for consideration within the next agreement.

The ECHO Program would like to thank the parties to the Conservation Agreement, as well as the program's many advisors and partners, for their tremendous voluntary efforts in Period 4 and for their ongoing commitment and participation in the Conservation Agreement to support the recovery of southern resident killer whales.

**Appendix 1: Period 4 Conservation
Agreement measures tracking document**

ECHO Program | Conservation Agreement Tracker - Period 4

Measure	Party leading activity	Activity (per description in CA Appendix A)	Objective over the term of the Agreement (per description in CA Appendix A)	Period 4 from agreement signing (descriptions in CA Appendix A updated per AWG/CAM input May & Jun 2022)	Period 4 Metric	Status	Period 4 Final update Jun 2022 - May 2023
A1	VFPA	Maintain management of ECHO Program	Maintain framework for ongoing engagement and collaboration; advancing research; coordinating, development, implementation, evaluation and reporting of voluntary Southern Resident Killer Whale (SRKW) threat reduction measures; and, promoting and raising awareness of research and threat reduction measures.	Convene 3-4 ECHO Program Advisory Working Group meetings per year to seek input and guidance. Convene ECHO Program Conservation Agreement and Technical Committee (Vessel Operator Committee and Acoustic Technical Committee) meetings on an as needed basis throughout the year to seek input and advice. Rely on input and advice to adaptively manage program.	4 AWG meetings 4 VOC meetings 1 CAM meeting Provide presentations as requested by AWG members, Indigenous groups and other parties as requested.	Complete	~ CAM meetings held to date: 2 (2022: Jul. 2023: Apr) ~ AWG meetings held to date: 5 (2022: Jun, Oct, Dec. 2023: Feb, Apr) ~ VOC meetings held to date: 6 (2022: Jul, Sep, Oct, Nov. 2023: Mar, May) ~ Provided training to CCG Marine Mammal Desk (Sep) ~ Updates to IMAG, Tier II Multi-Nation, Cumulative Effects of Marine Shipping (as requested by TC)
A2	GoC	GoC continue to engage with Indigenous groups and stakeholders on vessel related threats to SRKW and implementation of threat reduction measures.	Continue to enable involvement of Indigenous groups in the development and implementation of SRKW-related initiatives. Identify annual forums for engagement.	Proposed language that was not finalized with ECHO Program Indigenous Advisors in Period 4: Regular opportunities through AWG meeting agendas for GoC to share SRKW-related initiatives including with Indigenous groups at the ECHO Program table. GoC will involve and collaborate with interested Indigenous groups on the ECHO Program activities and facilitate input into those activities.	~ Pending	Carry forward to Period 5	During the period Canada continued to meet with Indigenous groups both bilaterally and through the multi-nation group and Indigenous and Multi-Stakeholder Advisory Group and Technical Working Groups to consult on seasonal measures for 2023.
A3	All	Provide relevant input to broader initiatives around the development of underwater noise targets	Contribute to ongoing discussions on the development of underwater noise reduction targets.	Convene workshop(s) of a task group involving DFO, TC, other interested AWG members, and invited experts to evaluate the information needs, opportunities, and best approaches, and to determine timeline and next steps, for developing regional ambient noise targets for the shipping sector, considering current and future traffic scenarios.	~ Convene workshop(s) of a task group involving DFO, TC, other interested AWG members, and invited experts to evaluate the information needs, opportunities, and best approaches, and to determine timeline and next steps, for developing regional ambient noise targets for the shipping sector, considering current and future traffic scenarios. ~ Ensure ECHO Program is informed and contributes as appropriate to related initiatives. ~ Prepare memo summarizing task group findings.	Carry forward to Period 5	Task Group convened and Workshop #1 held in April 2023. Planning underway and work advancing towards a full day, in-person Workshop #2 in October 2023. Interim memo due June 30, 2023.
B1	GoC	Engage US authorities, on vessel related threats to SRKW and implementation of threat reduction measures	Establish commitments on recovery measures from US authorities in shared waterways in SRKW critical habitat.	Ongoing consultation between Canada/U.S. on joint action that can be taken with a focus on implementing harmonized measures in shared waterways.	Participate in/convene 4 Canada-US coordination or collaboration meetings relating to SRKW actions involving large commercial vessels.	Complete	More than four meetings involving NOAA and/or Washington state representatives along with additional correspondence have occurred in period 4.
B2	GoC	Encourage dialogue and technical discussions on reducing ship generated noise through the IMO and other international fora	Propose a new work output that may result in updates to IMO MEPC.1/Circ.833 (April 2014) guidelines for the reduction of underwater noise from commercial shipping.	Work with international partners to advance discussions at the IMO and other international bodies.	~ Provide comments on IMO underwater noise guidelines for shipping, report to SDC in Jan 2023. ~ Participate in European initiatives on underwater noise (i.e. SATURN and PIAQUO).	Complete	~ Participated in IMO working group on URN in Jan 2023. Canada/TC coordinated the first IMO Correspondence Group work on the review of the URN Guidelines and identification of next steps. Guidelines revised and recommended for approval. Correspondence group coordinated by Canada/TC, continuing to advance work on implementation/ supporting materials for Guidelines. ~ In Jan 2023, Canada and the European Commission Delegation co-hosted an IMO side-event on 'Recent Progress on Vessel Underwater Noise Thresholds' with updates by TC, TG Noise, and VFPA ECHO. ~ Canada and partners currently organizing IMO expert workshop for September 2023 on potential co-benefits and trade-offs between the reduction of underwater radiated noise from ships and energy efficiency. ~ Participated in External Expert Advisory Board (EEAB) for EU Saturn Project (K.Trounce committee co-chair) ~ Provided advice to EU PIAQUO project ~ Provided data and advice to support European Maritime Safety Association NAVISON underwater noise modelling project ~ Ocean Noise conference (Barcelona)

ECHO Program | Conservation Agreement Tracker - Period 4

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B3	VFPA & GoC	Encourage Canadian and other relevant international ports to consider implementing incentives for quiet vessels	Increase the number of vessels with quiet vessel design, technologies and/or notations.	Continue targeted engagement and outreach efforts at both national and international level, as appropriate, to encourage a network of port incentive programs and to raise awareness of the need for quiet vessels with ship builders, ship owners, and shippers.	4+ dedicated communications with ports, ship builders, ship owners or shippers. Explore raising Quiet Notation for EcoAction program to 'platinum status'.	Complete	<ul style="list-style-type: none"> ~ Presented to aquatic noise conference in Berlin Jul 2022 on class society and incentives work. ~ Quiet notation for EcoAction raised to 'platinum' status for 2023 (75% discount on port fees). ~ Engagement with California partners ongoing re:development of an overarching west coast whale protection coalition to promote collaboration between existing programs, and engage more west coast ports, shippers and ship owners. ~ Agreement from International Association of Ports and Harbors to include an underwater noise indicator in the Environmental Ship Index. ECHO supporting the development of the indicator. ~ Working directly with a ship owner to evaluate effect of design differences on underwater noise
B4	VFPA & GoC	Convene vessel classification societies and technical experts to develop and align category-specific quiet vessel notations	Establish consistent measurement and analysis procedures, and quiet vessel notations between ship classification societies such that incentives offered at Port of Vancouver and elsewhere are also consistent.	Refine draft alignment document based on input from stakeholders and relevant research efforts. Host and report on 3rd international workshop.	Convene and report out on third workshop with class societies.	Complete	Workshops completed in late October. Report on third workshop sent out. Draft final of guidance document under review, publication expected spring 2023.
C1	GoC	Support the development and maintenance of an underwater hydrophone network in SRKW critical habitat	Measure ambient underwater noise levels throughout SRKW critical habitat, assess contributions of Large Commercial Vessels, support whale detection activities, and monitor the effectiveness of implemented mitigation measures for Large Commercial Vessels.	Review on an ongoing basis the need for additional underwater hydrophones and build on improving existing hydrophone network to address gaps.	Continue monitoring in SRKW Critical Habitat using hydrophone mooring locations in Salish Sea.	Complete	Hydrophone monitoring has continued in the Salish Sea for period 4. DFO Science currently have 11 moorings. Two of these, one in an Interim Sanctuary Zone (ISZ) at Swiftsure, that no longer exists, and one in an ISZ off Saturna Island, will be removed by the end of June 2023 and replaced by a single additional mooring in the Strait of Georgia. Exact location to be determined by the end of June.
C2	VFPA	Evaluate ECHO regional ambient noise data which was collected in 2016-2017	Establish what factors are contributing to existing ambient noise levels within SRKW critical habitat and determine ongoing monitoring needs for evaluating changes and trends into the future	VFPA to continue ambient noise monitoring in the Salish Sea at existing locations in Burrard Inlet, Haro Strait and Boundary Pass. DFO to continue ambient noise monitoring at Swiftsure Bank and the Strait of Juan de Fuca. If new information becomes available or ambient noise conditions change, seek opportunities to identify contributing factors and update guidance if appropriate.	Continue monitoring in Burrard Inlet, Haro Strait and Boundary Pass - publish annual reports to ECHO website.	Complete	Monitoring is ongoing. Annual ambient noise reports for Burrard Inlet, Haro Strait and Boundary Pass for 2022 are complete. All will be published to the website in June 2022
C3	VFPA & GoC	Establish underwater listening station in SRKW critical habitat	Implement listening station infrastructure to allow vessel operators to measure the individual noise profiles of their vessels; facilitate research testing of vessel quietening technologies/operations; and, allow the ECHO Program to continue gathering and analyzing vessel noise data for research purposes and to evaluate the potential for offering new port incentives	Monitor vessel source levels in real time. Make data available to vessel owners upon request. Advance testing of vessel quietening options.	Analyze data from Boundary Pass ULS and prepare quarterly progress reports. Evaluate quieting technology effects on URN for ≥1 vessel(s), if possible.	Complete	Boundary Pass ULS continues to collect data on vessel source levels, ambient noise and marine mammal detections. 2022 report complete. Working directly with a ship owner to evaluate effect of design differences on underwater noise.
C4	VFPA	Evaluate existing ECHO Program database of vessel source level measurements	Evaluate how different vessel design characteristics may be driving the noise profile of vessels. Identify key characteristics/commonalities of quietest and loudest vessels	Utilize the existing Boundary Pass dataset to evaluate if cavitation inception speed (CIS) can be identified in a single vessel with multiple opportunistic measurements. If CIS can be reliably identified for a range of vessels, use this data to assess the distribution CIS by vessel category which may help inform optimal slowdown speeds. Investigate potential for statistical relationship between CIS and ship movement with or against the tide.	Publish report on cavitation inception study to ECHO website.	Complete	Final report posted to ECHO website

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C5	All	Advance research studies to explore new underwater noise reduction measures for Large Commercial Vessels* (To be updated annually based on agreement of new/emerging potential measures)	Test/trial new design, technologies and/or operational measures that may reduce underwater noise from vessels, particularly in SRKW critical habitat and within key SRKW foraging areas	<ul style="list-style-type: none"> ~ Trial/test inbound slowdown in Swiftsure Bank in 2022. ~ Evaluate DFO Science research and TSS feasibility study results to advance discussion on potential noise reduction measures (including lateral displacement) at the mouth of the Fraser. ~ TC Quiet Vessel Initiative to share relevant updates of quiet ship design and technology advancements with ECHO program. ~ Consider additional studies [e.g. relationship of SRKW presence with tides) to inform conditions under Active Vessel Traffic Management (AVTM) (D9)]. 	<ul style="list-style-type: none"> ~ Trial/test slowdown in inbound lane at Swiftsure Bank. ~ TC update AWG on actions resulting from TSS feasibility study. ~ Prepare and share memo on preliminary analysis of SRKW presence with tides. 	Complete	<ul style="list-style-type: none"> ~ Slowdown in Swiftsure Bank inbound lane ran Jun 1 to Oct 31, 2022 . ~ The TSS feasibility study is now available by request from Transport Canada. ~ Memo on preliminary analysis of SRKW presence with tidal cycle distributed to CAM and AWG in May, 2023.
C6	All	Advance research studies to understand ship noise sources and factors in design that could reduce underwater noise. *	Test/trial the impacts of new vessel design and/or technologies on underwater noise using the Boundary Pass underwater listening station or other acoustic data sources.	Should the opportunity arise, test/trial impacts of vessel design/technologies on underwater noise using the Boundary Pass underwater listening station or other acoustic data sources. Work may be conducted with TC's Quiet Vessel Initiative (QVI).	Work with vessel owners/operators to evaluate design and maintenance impact on underwater noise.	Complete	Completed project with major container line to evaluate underwater noise differences associated with design differences for sister ships.
C7	VFPA	New for Period 4	New for Period 4: Explore and estimate the potential co-benefits of vessel slowdowns to both SRKW, other whale species and industry participants	Utilizing modelling techniques, evaluate the potential co-benefits of vessel slowdowns including reduced air emissions, and reduced lethality of vessel strike.	Publish report on co-benefits to ECHO website.	Complete	Co-benefits study complete and published to ECHO website in May 2023
D1 - Vessel Slow downs	All	Establish voluntary seasonal slowdown of Large Commercial Vessels in Haro Strait*	Participation rates, ambient underwater noise levels and affected southern resident killer whale foraging time in Haro Strait meet or exceed the participation, ambient noise reduction and affected southern resident killer whale foraging time goals agreed to annually by the ECHO Advisory Working Group, or comply with underwater noise reduction targets when they are developed.	Report out on the 2021 Haro Strait and Boundary Pass slowdown year, revisit the voluntary maximum speed targets and slowdown duration and implement the 2022 slowdown. Review noise reduction levels achieved during the 2022 Haro Strait and Boundary Pass slowdown and set speed targets and slowdown duration parameters as needed for implementation in 2023.	<ul style="list-style-type: none"> ~ Publish 2021 slowdown report and implement 2022 slowdown in Haro-Boundary. ~ Revisit slowdown parameters for 2023 based on learnings from 2022. 	Complete	<ul style="list-style-type: none"> ~ 2021 report published on ECHO website. Slowdown in Haro Strait and Boundary Pass took place June 1 to October 31, 2022. ~ 2022 acoustic results have been finalized. 2023 parameters including speed targets and slowdown duration were discussed and finalized at the AWG meeting on April 13, 2023.
D2 - Vessel Slow downs	All	Based on SRKW usage and subject to navigational safety and operational considerations, identify other possible candidate areas within SRKW critical habitat to implement voluntary seasonal slowdowns of Large Commercial Vessels	Participation rates and ambient underwater noise levels in other key southern resident killer whale foraging areas meet or exceed the participation and ambient noise reduction goal agreed to annually by the ECHO Advisory Working Group, or comply with underwater noise reduction targets when they are developed. In other key southern resident killer whale foraging areas where behavioral response modelling exists, decrease the amount of time southern resident killer whale foraging may be affected by vessel noise, to meet or exceed the goals set by the ECHO Program AWG each year.	Review noise reduction levels achieved during the 2021 Swiftsure slowdown year and revisit voluntary maximum speed targets, slowdown duration and geographic extent, as needed for implementation in future year. (Note: Advancing work to evaluate expanding Swiftsure Bank slowdown to include inbound traffic in 2022 is also reflected in measure C5.)	<ul style="list-style-type: none"> ~ Publish 2021 slowdown report and implement 2022 slowdown in Swiftsure Bank. ~ Revisit slowdown parameters for 2023 based on learnings from 2022. 	Complete	<ul style="list-style-type: none"> ~ 2021 report published on ECHO website. Slowdown in Swiftsure Bank began on June 1 and concluded on October 31, 2022. ~ 2023 parameters were discussed and finalized at the AWG meeting on April 13, 2023. Inbound slowdown at Swiftsure Bank occurred in 2022 and will continue in 2023.
D3 - Vessel Slow downs	All	Address commercial and operational constraints to expanding the area and/or duration of vessel slowdowns	Eliminate barriers to full participation and/or compensate those that are negatively affected economically such that they can fully participate.	Assess progress made on a yearly basis and re-adjust actions needed to eliminate barriers to implementation going forward (including framework for compensation as required)	Continue Transport Canada reimbursement program in 2022 season for additional pilotage costs in Haro-Boundary slowdown.	Complete	All invoices paid out, final report submitted to TC.

ECHO Program | Conservation Agreement Tracker - Period 4

Measure	Party leading activity	Activity (per description in CA Appendix A)	Objective over the term of the Agreement (per description in CA Appendix A)	Period 4 from agreement signing (descriptions in CA Appendix A updated per AWG/CAM input May & Jun 2022)	Period 4 Metric	Status	Period 4 Final update Jun 2022 - May 2023
D4 - Vessel Slow downs	All	Improve direct effect of vessel speed reductions by implementing real-time tracking and notification of SRKW locations year round	Provide SRKW presence notification tools to professional mariners, to potentially reduce speed and associated noise impacts to SRKW in real time and year round.	Develop, test and/or refine tools and increase communication/collaboration between initiatives (e.g. Marine Mammal Desk, Whale Tracking Network, Whale Report Alert System, Whale Detection and Collision Avoidance Program) and based on the status and outcomes of these initiatives, assess feasibility of implementing real time SRKW and vessel tracking, and determine potential effectiveness of dynamic management.	<ul style="list-style-type: none"> ~ Support Oceanwise to engage with key WRAS stakeholders through the WRAS Advisory Committee and initiate pilot project to assess feasibility of integrating hydrophone alerts into WRAS. ~ DFO to publish three technical reports relating to real time tracking of SRKW. 	Carry forward to Period 5	<ul style="list-style-type: none"> ~ WRAS advisory meeting and acoustic technical meetings held Nov 2022 ~ SMRU, JASCO, LAPIS, OrcaSound and Ocean Wise gathered needs of mariners user-interface for integrating acoustic detections into WRAS ~ Oceanwise issued a survey to WRAS users in April 2023 to confirm user-interface meets their needs. ~ ECHO Program working with JASCO to share real time acoustic detections of whales from Boundary Pass listening station - anticipate testing of acoustic detections on WRAS platform in summer 2023. ~ CCG upgrading system radar network which feeds into same system as AIS. Following upgrade, CCG will look at integrating WRAS into AIS (likely 2024) ~ CCG suggested convening a technical working group to gather mariner needs for user-interface. ~ DFO update on three technical reports: <ol style="list-style-type: none"> 1) The effectiveness of shore-cabled hydrophone networks to track SRKW in near real-time report to be completed and ready for distribution by end May 2023. 2) The effectiveness of automated thermal imaging (TI) whale detection technology to track SRKW in near shore waters expected to be finished in early-period 5. 3) Does combining automated acoustic and thermal imaging-based whale detection improve whale tracking abilities (not just for killer whales), paper anticipated to be published in fall of 2023 (carried into period 5).
D5 - Lateral displacement	All	Evaluate effect of lateral displacement outbound in Strait of Juan de Fuca based on 2018 trial results	If participation rates and ambient underwater noise levels meet or exceed the participation and ambient noise reduction goals agreed to annually by the ECHO Program advisory working group, or comply with underwater noise reduction targets when they are developed and if agreement with Indigenous groups and transboundary partners are reached, continue implementation of voluntary lateral displacement.	Post 2021 lateral displacement report and, where results continue to be positive and agreement with Indigenous groups and transboundary partners are reached, continue implementation of voluntary lateral displacement in Strait of Juan de Fuca in 2022.	Publish 2021 lateral displacement report and implement 2022 lateral displacement in Strait of Juan de Fuca.	Complete	2021 report published on ECHO website. Strait of Juan de Fuca lateral displacement took place between June 1 and October 31, 2022.
D7 - Incentives	VFPA	Continue to offer and potentially expand available VFPA EcoAction incentives for those who have taken action to reduce underwater noise from their vessel	Continue to promote the availability of EcoAction incentives to vessels calling Port of Vancouver with the goal of reducing underwater noise from Large Commercial Vessels in SRKW critical habitat.	Work with partners, including class societies, Green Marine, ship owners and technology companies to promote availability of EcoAction incentives. Evaluate new underwater noise reduction technologies/programs/certifications for inclusion in EcoAction, as applicable	Explore raising quiet ship notations for EcoAction program to 'platinum status'.	Complete	Quiet ship notations receiving platinum discount as of Jan 1, 2023.
D8 - Incentives	VFPA	Evaluate the potential for offering 'quiet vessels' an option to opt out of voluntary noise reduction operational mitigations such as slowdowns	Evaluate appropriate source level thresholds for 'quiet vessels', encourage and drive innovation towards application of quiet vessel technology and design.	Participate in and share data with TC's National Working Groups on Underwater Vessel Noise Reduction Targets (UVNRT). Consider further work around 'opt out thresholds' as outcomes of working group become available.	<ul style="list-style-type: none"> ~ Participate in UVNRT policy committee meetings. ~ Consider modelling benefits if/when UVNRT vessel source levels chosen. 	Carry forward to Period 5	<ul style="list-style-type: none"> ~ Summary from the UVNRT technical committee was provided to the Policy committee and final recommendations to government of Canada expected in March of 2023. The work of the UVNRT Policy group is still underway. A report including recommendations is anticipated to be published by TC in summer 2023. ~ Scoping for modelling of UVNRT targets, future traffic etc. currently underway - modelling to be conducted in Period 5.
D9 - Other	All	Work to better understand and seek opportunities to test the optimization of vessel sailing times within existing shipping regime.	Subject to assessing benefits of such an approach, optimize existing sailing schedules to create longer windows where commercial vessels are not present in key SRKW foraging areas, when whales are present.	ECHO Program to continue engaging with the VFPA's operations department to explore how potential whale protection measures (e.g. sailing with the tide, creating longer periods of quiet, slowing down through foraging areas when going directly to anchor etc.) might be considered in the development and roll out of the regional Active Vessel Traffic Management (AVTM) initiative.	<ul style="list-style-type: none"> ~ ECHO Program to continue engaging with VFPA AVTM team for regular updates and information exchanges. ~ Map out next steps including research and information needs to help evaluate protection measures and inform decision making. 	Carry forward to Period 5	<ul style="list-style-type: none"> ~ ECHO Program continues to engage with port leads on AVTM. Draft code of conduct for vessels at anchorage established. More information at : https://portvancouver.civilspace.io/en/projects/25. ~ Results of preliminary investigation of SRKW presence and tides is complete and briefing memo to be distributed in May 2023. ~ Research/ next steps have not yet been mapped out - this will be conducted in Period 5.

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E1	VFPA & GoC	Test a real-time whale notification system for professional mariners called WhaleReport Alert System (WRAS) and evaluate its utility, benefits and effectiveness	Provide a notification tool to professional mariners which provides real time information on the location of whales with the goal of reducing threats from commercial vessels in SRKW critical habitat.	Support with the ongoing maintenance of WRAS and participation in the WRAS Advisory Committee. Test integration of other whale detection data sources to WRAS.	Participate in WRAS Advisory Committee meeting(s) and provide funding for enhancement efforts. Provide funding and support for testing the integration of hydrophone data to WRAS.	Carry forward to Period 5	<p>~ Funding agreement from VFPA to Ocean Wise established in Q3 2022</p> <p>~ Preliminary meeting on acoustic integration held in Aug 2022 with SMRU, JASCO, LAPIS, Ocean Wise, Orcasound. WRAS acoustic technical meeting held in Nov 2022 with mariners, hydrophone operators and app developer to gather needs of mariners user-interface for integrating acoustic detections into WRAS.</p> <p>~ Oceanwise issued a survey to WRAS users in April 2023 to confirm user-interface meets their needs. As a first trial of acoustic data into WRAS, the ECHO Program is working with JASCO to share real time hydrophone data from Boundary Pass listening station. It is anticipated that testing of acoustic detections on the WRAS platform will take place summer 2023.</p>
E2	VFPA	Develop online training module for professional mariners to help them identify whales, reduce vessel related threats and safely navigate in their presence.	Make online training tutorial available to all mariners on ECHO Program website and encourage regional vessel operators to build the tutorial into their corporate training programs.	Promote and monitor uptake of online tutorial.	Promote uptake of online tutorial with goal to reach an additional 100 new registrants.	Complete	Lindblad Expeditions added Whales in our Waters tutorial to their internal learning management system in May 2023. They expect up to 130 staff (~85 crew and up to 50 naturalists) to take the tutorial.
Section 5.2.2 E	PPA	Explore opportunities to improve efficiencies to the pilotage system to reduce barriers to participation in the voluntary initiatives.	Improve efficiencies to the pilotage system to reduce barriers to participation in the voluntary initiatives.	Continue, with relevant interested parties, to evaluate opportunities to improve efficiencies in order to reduce terminal related pilotage delays, and thereby reduce the likelihood of excess hours.	~ Pending	Complete	Throughout Period 4 PPA participated in regular meetings with terminals to discuss opportunities to reduce delays and improve efficiencies.