



This licence and/or permit is issued under the authority of SECTION 52 OF THE FISHERY (GENERAL) REGULATIONS.

This licence and/or permit authorizes the person(s) listed below, subject to the following terms and conditions, to collect the species and quantity of fish identified below for: Scientific purposes. Non-compliance with any condition of this licence and/or permit may result in the cancellation of this licence and/or permit.

Licence/Permit Activity Description:

This project is a multi-year collaboration led by the Society for Ecosystem Restoration Northern BC, with funding from various agencies including the Habitat Trust Conservation Foundation, the Provincial Fish Passage Technical Working Group and the Ministry of Transportation and Infrastructure. The project aims to restore fish passage at barrier culverts through detailed sampling to assess fish presence, species composition, movement, and habitat effectiveness. Fieldwork is led by Allan Irvine of New Graph Environment Ltd., in collaboration with teams from the Office of Wet'suwet'en, Gitskan Watershed Authorities, and Gitsxan Environmental Services.

The rationale for sampling is to inform fish presence/absence, species composition/density, abundance estimates, movement, growth, and survival as part of habitat confirmations and effectiveness monitoring related to fish passage restoration at barrier culverts. The methodologies include electrofishing, minnow trapping, and dipnetting, depending on site conditions, to gather data upstream and downstream of culverts. The study's objectives include determining fish movement into restored areas, assessing pre-remediation fish movement through problematic culverts, and evaluating system productivity following structure replacement.

NON-RETENTION

Licence Holder:

FIN: 149478
6 REGENT ST.
NELSON BC V1L 2W4

NEW GRAPH ENVIRONMENT LTD

Contact Number: 250-777-1518

Contact Party:

FIN: 149479 IRVINE, ALLAN

Contact Number: 250-777-1518

Individuals or groups assisting with the authorized activity:

Qualified employees of

New Graph Environment Ltd.
Office of Wet'suwet'en
Gitskan Watershed Authorities
Gitsxan Environmental Services

Species, Quantity of Fish, Area(s) and Gear:

Species: CHINOOK SALMON (*Oncorhynchus tshawytscha*); COHO SALMON (*Oncorhynchus kisutch*); PINK SALMON (*Oncorhynchus gorbuscha*);

Life Stage: Juvenile



Gear: Dip Net
Electroshocker
Trap, Gee/Minnow

Licence Area: tributary to Coal Creek; Sandstone Creek; tributary to McDonell Lake; Tributary to Gramophone Creek; Kathlyn Creek; Thompson Creek; Lemieux Creek; Robin Creek; Tributary to Waterfall Creek; Helps Creek; Stock Creek; Tributary to Owen Creek; Coffin Creek; Tributary to Skeena River; Gershwin Creek

To be Retained: 0

Reporting Requirements:

XR 377 2024

Due Date 31-Jan-2025

Please submit the final report to DFO.NCSP-PSCN.MPO@dfo-mpo.gc.ca.

Terms and Conditions:

Contact Local Fisheries Office:

Prior to sampling and upon completion of any fishing activities the local Fishery Officer, of the Department of Fisheries and Oceans must be informed of the exact time, location, purpose and samplers.

Max McDonald – Email - Maxwell.mcdonald@dfo-mpo.gc.ca - 250-626-3316 - A/ Detachment Commander- Masset Field Office- Areas 1 and 101.

Adam Jackson – Email - Adam.jackson@dfo-mpo.gc.ca - 250-559-4411 - Field Supervisor, Queen Charlotte Field Office Areas 2, 102, 130 and 142.

Darla Farrington – Email - Darla.Farrington@dfo-mpo.gc.ca - For PFMA 3,4,5 including all streams and tributaries that entering marine waters. From Stewart BC (Marine Waters) down to the end of Grenville Channel, and halfway (midpoint of Hecate Strait) to Haida Gwaii.

Jason Davey – Email - Jason.Davey@dfo-mpo.gc.ca - 250-615-7054 - For Terrace to Kitimat and all of PFMA Area 6 to the south, to the Khyex River to the west and to Bell Irving River to the North including Stewart, and for all freshwater areas in the Nass watershed.

Carey Ma – Email - Carey.ma@dfo-mpo.gc.ca - 250-877-2707 - For Skeena River from confluence with Legate creek and all upstream Skeena tribs (Kitwanga, Kispiox, Sustut, Babine, Bulkley – including the Morice) and all of Babine Lake and it's tribs.

Brian Gyorfi – Email - Brian.Gyorfi@dfo-mpo.gc.ca – 250-615-5359 – For central coast PFMA 7-10 and all freshwater bodies flowing into PFMA 7-10.

Notification shall occur by telephone during normal business hours. If you are unable to notify the local office on evenings or weekends, advise the DFO Radio Room at 1-800-465-4336 prior to sampling.

- Name on the licence and names of samplers
- Licence number
- Dates and times when sampling will occur
- Specific location where sampling will occur
- Locations of any unattended gear and how long that gear will remain there

It is the responsibility of the licence holder to ensure that samplers are experienced and competent in the fish collection methods authorized in this licence.



All specimens must be released unharmed into the water body or course from which they originated and as near as possible to the location from which they were captured. Fish must be released in a manner that causes the least possible harm.

Any mortalities must be recorded and submitted in the report to DFO.

Non-Salmon Species: Contact the BC Ministry of Forests, Lands, Natural Resources and Rural Development for a scientific licence to collect non-salmon species including Steelhead, Rainbow trout and Cutthroat trout.

A breach of licence conditions is a Fisheries Act offence.

This licence authorizes collections to be made by the licensee and employees, volunteers and students of the licensee provided that all persons, other than minors who are engaged in activities under the authority of this licence, are carrying suitable photo identification to be produced upon request of any Fishery Officer or Fishery Guardian.

Specimens collected under this permit must not be sold.

All fish must be released into the water body or course from which they originated and as near as possible to the location from which they were captured.

Fish must be released in a manner that causes the least possible harm.

Any mortalities must be recorded and submitted in the report to DFO.

This licence requires submission of a final report to be sent electronically to DFO.NCSP-PSCN.MPO@dfo-mpo.gc.ca.

Refer to the reporting requirements on this licence for due date.

Please refer to the scientific licence number when submitting report.

A report will be required by DFO within 30 days of end of the project and must contain at minimum:

1. License number
2. Sampling date, time, crew, stream name, watershed name;
3. GPS position of site(s);
4. Number of captured aquatic organisms by species (including notes on any injuries or mortalities); and
5. If conducted: bio-sampling data (lengths, weights)

This licence may be amended or revoked by the Department prior to the expiry date if deemed necessary.

It is the responsibility of the licence holder to ensure that samplers are experienced and competent in the fish collection



methods authorized in this licence.

Section 32 (1) of the federal Species at Risk Act prohibits killing, harming, harassing, capturing or taking an individual of a wildlife species which is listed on Schedule 1 as an extirpated species, an endangered species or a threatened species. Refer to the SARA Public Registry at <http://www.sararegistry.gc.ca> to determine if species at risk may be in your research area and to apply for a permit if required.

Copies of this licence must accompany the collecting personnel, be on board any collecting vessel and be carried by the transport vehicle at all times during collection and transport of samples. The licence must be produced upon the request of a Fishery Officer or Guardian.

Electrofishing is not permitted in the vicinity of spawning salmon or redds. Electrofishing can be severely damaging to eggs and alevins and must be avoided where eggs and alevins may be present. A trained and certified electrofisher operator must be a part of the electrofishing crew. Electroshocking will be avoided in water with a temperature below 5 degrees Celsius. Where this is not possible, all other methods of fish capture will be used prior to electroshocking.

All gear left unattended must be clearly labelled with the Licence Number and must not interfere with the public right of navigation.

No specimens may be retained.

Licence Issued: 21 August 2024

Licence Printed: 21 August 2024

Licence Issued By: TREVOR SOWERS, Fisheries and Oceans Canada

Al Irvine
New Graph Environment Ltd.
al@newgraphenvironment
250-777-1518
Date Original: 2024-08-09
Date Revised: 2024-08-20

Ministry of Water, Land and Resource Stewardship
and
Fisheries and Oceans Canada

Re: Scientific Fish Collection Permit Application

Please note that permitting to Fisheries and Oceans Canada is requested for inventory purposes only. PIT tagging is not proposed for salmon species. PIT tagging has been proposed to the Provincial Ministry of Water, Land and Resource Stewardship (WLRS) for provincial jurisdiction species only to monitor fish movement and growth over multiple years.

This permit application can also be viewed online [at this link](#). A summary of sites to be potentially assessed is included as Tables [2](#) - [3](#), details of fish species potentially encountered is presented in Table [4](#) and an overview map displaying potential sample locations is included as Figure 1. A kml file of the sites is included as an attachment to the application and can also be downloaded [from here at this link](#). There is an extensive amount of information contained in the kml file (accessed by clicking on sites) including brief summaries of background reporting data (when available).

Brief description of project/activities

This work is a multi-year collaboration of many groups and an initiative of the Society for Ecosystem Restoration Northern BC. Funding for the project is through the Habitat Trust Conservation Foundation, Ministry of Transportation and Infrastructure and the Provincial Fish Passage Technical Working Group. Al Irvine, R.P.Bio from New Graph Environment Ltd. is leading the fieldwork with field and office collaboration with teams from the Office of Wet'suwet'en (contact Julia Onderwater - Julia.Onderwater@wetsuweten.com or Dave Dewit - david.dewit@wetsuweten.com), Gitksan Watershed Authorities (contact Alicia Fernando - afernando@gitksanwatershed.com) and Gitksan

Environmental Services (contact Chaz Ware - chaz.ware@gitxsanbusiness.com). Past reports are below:

- https://www.newgraphenvironment.com/fish_passage_bulkley_2020_reporting/
- https://www.newgraphenvironment.com/fish_passage_skeena_2021_reporting/
- https://www.newgraphenvironment.com/fish_passage_bulkley_2022_reporting/
- https://www.newgraphenvironment.com/fish_passage_skeena_2022_reporting/
- https://www.newgraphenvironment.com/fish_passage_skeena_2023_reporting/

Rationale

Rationale for sampling is to inform fish presence/absence, species composition/density, abundance estimates, movement, growth, and survival as part of habitat confirmations and effectiveness monitoring related to fish passage restoration at barrier culverts. Habitat confirmation methodology information can be referenced in the above reports which builds on the [Fish Passage Technical Working Group Phase 2 protocol](#). Presence/absence of fish, species composition/abundance, distribution limits and fish movement can be useful for prioritizing which crossings are a best fit for fish passage restoration and inform baseline as well as follow up effectiveness monitoring.

Methodologies

Sampling methodologies will be dependent on the site, fish species suspected, type of habitat encountered, risks to aquatic organisms potentially present (Table 1) and ongoing communications. Sampling methods may include minnowtrapping, electrofishing, and dipnetting upstream and downstream of current and past barrier culvert locations.

Sampling is proposed at streams included in Tables 2 - 3 where we will be performing habitat confirmations and follow up site visits related to past habitat confirmations/fish passage remediations.

PIT Tagging

As part of this permit application we are proposing tagging for provincial jurisdiction species only. PIT tagging is not proposed for salmon species. Our study plan is (when time allows and PIT tagging is expected to increase our state of knowledge about the subject system) to electrofish small sites both upstream and downstream of priority culvert “barrier” sites and insert biotag APT12 PIT tags into the body cavity of select fish captured over 60mm. Fish location (UTM), length and weight will also be collected. In addition to providing information on abundance upstream and downstream of potential culvert restoration sites, the study will also provide information for

monitoring programs to document fish movement, growth and survival at sites over multi-year timeframes. Main objectives are to determine

1. if fish are moving into restored areas
2. if before any remediation is conducted - fish are moving through sites where stream crossing structures (culverts) likely cause connectivity issues
3. evaluate if productivity of the systems are increasing following bridge installation and/or if fish are moving upstream/downstream of where replaced/removed structures are located

As we wish to tag all fish over 60mm in each site sampled we would like to apply for a permit allowing a maximum of 600 fish with a maximum of 150 fish/stream. Although we are requesting a maximum of 150 fish/stream, we have listed 150 fish of each species per stream because we will not know the species composition of the sites until the sampling occurs. In general, only salmonid and burbot species will be tagged with likely species present being rainbow trout, cutthroat trout, and dolly varden. Based on past assessments in the same and similiar systems in the region, the number of fish tagged per stream are very likely to be much less than 150 however we are requesting the maximum number of fish to be tagged to facilitate permit application procedures and allow for flexibility in the field based on actual sampling results.

Risks associated with project/activities and associated mitigation

Table 1: Risks and mitigation

Impact	Mitigation
High Voltage Injuries	Use the minimum effective voltage. Avoid contacting fish with the anode. Avoid electrofishing directly adjacent to metal culverts.
Disruption of Spawning	Avoid electrofishing during highest risk periods in likely spawning habitat.
Physical Stress on Fish	Quick/gentle handling and release of captured fish.
Injury from PIT Tagging Surgeries	Shallow insertion of tags and use of fresh sterile syringes every approximately 10 surgeries
Mortality in traps due to predation and starvation	Ensure all traps set are retrieved within 24 hours.

Please note that the sampling will be completed before October 31 (end of August till early October) however the end-date of the sampling period is listed as Dec 31 on the application to allow time outside of the busy field season for the data to be processed, QA'd and organized so that required reporting can be as informative as possible when submitted. An example of how we have been presenting results and methodologies from past assessments can be referenced in reports above.

Please do not hesitate to contact me if you need more information or have any questions or concerns.

Al Irvine, R.P.Bio

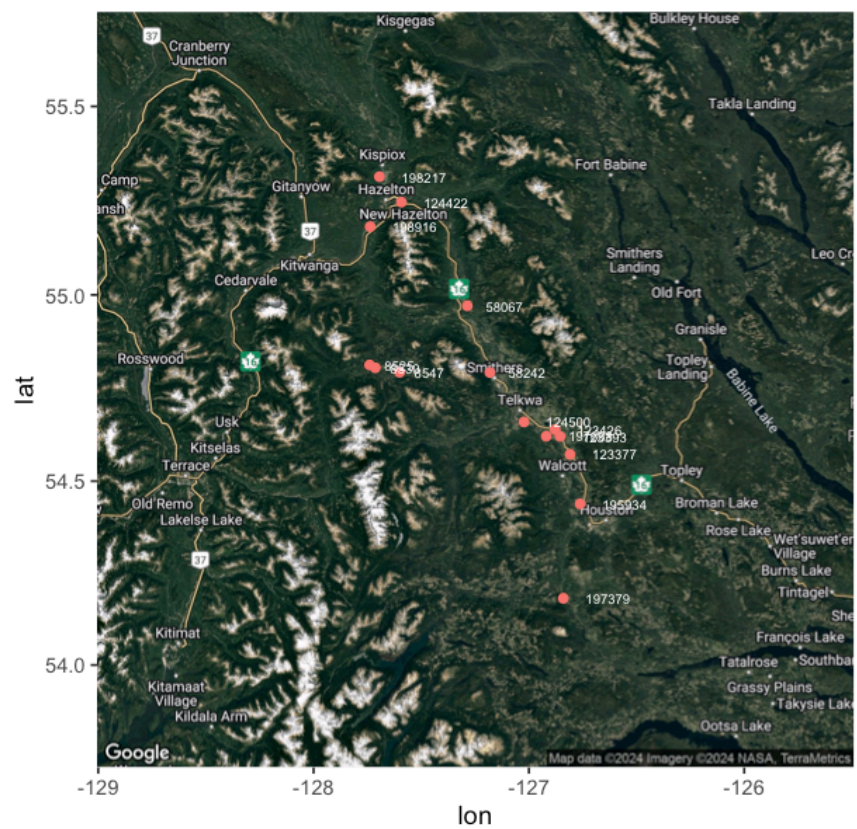


Figure 1: Location of potential sample sites.

Table 2: Potential sampling locations.

id	stream_name	wsc_code	utm_zone	utm_easting	utm_northing	watershed_group_code
8525	tributary to Coal Creek	440-741100-11200-00000-0000-0000-000-000-000-000-000-000	9	581004	6074666	ZYMO
8530	Sandstone Creek	440-767000-00000-00000-0000-0000-000-000-000-000-000-000	9	582713	6073870	ZYMO
8547	tributary to McDonell Lake	440-847000-00000-00000-0000-0000-000-000-000-000-000-000	9	589980	6072661	ZYMO
58067	Tributary to Gramophone Creek	460-223800-00000-00000-0000-0000-000-000-000-000-000-000	9	609726	6092894	BULK
58242	Kathlyn Creek	460-345400-00000-00000-0000-0000-000-000-000-000-000-000	9	616947	6073197	BULK
123377	Thompson Creek	460-517700-00000-00000-0000-0000-000-000-000-000-000-000	9	641633	6049398	BULK
123393	Lemieux Creek	460-487900-11100-00000-0000-0000-000-000-000-000-000-000	9	638502	6054711	BULK
123426	Robin Creek	460-487900-00000-00000-0000-0000-000-000-000-000-000-000	9	636935	6056693	BULK
124422	Tributary to Waterfall Creek	460-007300-39470-00000-0000-0000-000-000-000-000-000-000	9	589500	6123161	BULK
124500	Helps Creek	460-437000-00000-00000-0000-0000-000-000-000-000-000-000	9	627541	6058702	BULK
195934	Stock Creek	460-589500-30000-00000-0000-0000-000-000-000-000-000-000	9	645134	6034600	BULK
197379	Tributary to Owen Creek	460-600600-23900-13000-0000-0000-000-000-000-000-000-000	9	640960	6005930	MORR
197668	Coffin Creek	460-472700-00000-00000-0000-0000-000-000-000-000-000-000	9	634342	6054605	BULK
198217	Tributary to Skeena River	400-448500-00000-00000-0000-0000-000-000-000-000-000-000	9	582875	6130541	KISP
198916	Gershwin Creek	400-415300-00000-00000-0000-0000-000-000-000-000-000-000	9	580429	6115770	KISP

Table 3: Potential sample site details

id	stream_name	sp_upstr	fish_tags
8525	tributary to Coal Creek	DV	150
8530	Sandstone Creek	CT;DV;RB	150
8547	tributary to McDonell Lake	–	150
58067	Tributary to Gramophone Creek	RB;ST	150
58242	Kathlyn Creek	BB;CAS;CC;CO;CT;DV;L;LNC;LSU;MW;NSC;OS;PCC;PK;RB;RSC;SA;ST;SU;WF;WSU	150
123377	Thompson Creek	CT;DV;RB	150
123393	Lemieux Creek	CT;DV;LNC;NSC;RB;SU	150
123426	Robin Creek	BT;CT;RB;TR	150
124422	Tributary to Waterfall Creek	CO;DV	150
124500	Helps Creek	CT;DV;LNC;LSU;RB	150
195934	Stock Creek	CT;KO;LSU;RB	150
197379	Tributary to Owen Creek	CO;RB	150
197668	Coffin Creek	CSU;CT;DV;LSU;MW;RB;RSC	150
198217	Tributary to Skeena River	–	150
198916	Gershwin Creek	CT;DV	150

Table 4: Fish species recorded in the Fisheries Information Summary System within the freshwater atlas watershed group areas

Scientific Name	Species Name	BC List	COSEWIC	Bulkley	Kispiox	Morice	Zymoetz
Catostomus catostomus	Longnose Sucker	Yellow	–	Yes	Yes	Yes	Yes
Catostomus commersonii	White Sucker	Yellow	–	Yes	Yes	Yes	–
Catostomus macrocheilus	Largescale Sucker	Yellow	–	Yes	Yes	Yes	Yes
Chrosomus eos	Northern Redbelly Dace	Yellow	–	Yes	–	–	–
Coregonus clupeaformis	Lake Whitefish	Yellow	–	Yes	Yes	Yes	–
Coregonus sardinella	Least Cisco	Blue	–	–	–	–	–
Cottus aleuticus	Coastrange Sculpin (formerly Aleutian Sculpin)	Yellow	–	Yes	Yes	Yes	–
Cottus asper	Prickly Sculpin	Yellow	–	Yes	Yes	Yes	Yes
Cottus cognatus	Slimy Sculpin	Yellow	–	–	Yes	–	–
Couesius plumbeus	Lake Chub	Yellow	DD	Yes	Yes	Yes	–
Entosphenus tridentatus	Pacific Lamprey	Yellow	–	Yes	–	Yes	–

Scientific Name	Species Name	BC List	COSEWIC	Bulkley	Kispiox	Morice	Zymoetz
Hybognathus hankinsoni	Brassy Minnow	No Status	–	Yes	–	–	–
Lampetra ayresii	River Lamprey	Yellow	–	–	–	–	–
Lota lota	Burbot	Yellow	–	Yes	Yes	Yes	Yes
Mylocheilus caurinus	Peamouth Chub	Yellow	–	Yes	Yes	Yes	Yes
Oncorhynchus clarkii	Cutthroat Trout	No Status	–	Yes	Yes	Yes	Yes
Oncorhynchus clarkii	Cutthroat Trout (Anadromous)	No Status	–	Yes	Yes	–	Yes
Oncorhynchus clarkii clarkii	Coastal Cutthroat Trout	Blue	–	Yes	Yes	Yes	Yes
Oncorhynchus clarkii lewisi	Westslope (Yellowstone) Cutthroat Trout	Blue	SC (Nov 2016)	–	Yes	–	–
Oncorhynchus gorbuscha	Pink Salmon	Not Reviewed	–	Yes	Yes	Yes	Yes
Oncorhynchus keta	Chum Salmon	Not Reviewed	–	Yes	Yes	Yes	Yes
Oncorhynchus kisutch	Coho Salmon	Not Reviewed	–	Yes	Yes	Yes	Yes
Oncorhynchus mykiss	Rainbow Trout	Yellow	–	Yes	Yes	Yes	Yes
Oncorhynchus mykiss	Steelhead	Yellow	–	Yes	Yes	Yes	Yes
Oncorhynchus mykiss	Steelhead (Summer-run)	Yellow	–	Yes	–	Yes	–
Oncorhynchus mykiss	Steelhead (Winter-run)	Yellow	–	–	Yes	–	Yes
Oncorhynchus nerka	Kokanee	Not Reviewed	–	Yes	Yes	Yes	Yes
Oncorhynchus nerka	Sockeye Salmon	Not Reviewed	–	Yes	Yes	Yes	Yes
Oncorhynchus tshawytscha	Chinook Salmon	Not Reviewed	E/T/SC/DD/NAR (Nov 2020)	Yes	Yes	Yes	Yes
Prosopium coulterii	Pygmy Whitefish	Yellow	NAR (Nov 2016)	Yes	Yes	Yes	–
Prosopium coulterii pop. 3	Giant Pygmy Whitefish	Yellow	NAR (Nov 2016)	Yes	–	–	–
Prosopium cylindraceum	Round Whitefish	Yellow	–	–	–	–	–
Prosopium williamsoni	Mountain Whitefish	Yellow	–	Yes	Yes	Yes	Yes
Ptychocheilus oregonensis	Northern Pikeminnow	Yellow	–	Yes	Yes	Yes	Yes
Pungitius pungitius	Ninespine Stickleback	Unknown	–	Yes	–	–	–
Rhinichthys cataractae	Longnose Dace	Yellow	–	Yes	Yes	Yes	Yes
Rhinichthys falcatus	Leopard Dace	Yellow	NAR (May 1990)	–	–	Yes	–
Richardsonius balteatus	Redside Shiner	Yellow	–	Yes	Yes	Yes	Yes
Salvelinus confluentus	Bull Trout	Blue	SC (Nov 2012)	Yes	Yes	Yes	Yes
Salvelinus fontinalis	Brook Trout	Exotic	–	Yes	–	Yes	–
Salvelinus malma	Dolly Varden	Yellow	–	Yes	Yes	Yes	Yes
Salvelinus namaycush	Lake Trout	Yellow	–	Yes	Yes	Yes	–
–	All Salmon	–	–	–	Yes	–	–
–	Arctic Char	–	–	–	–	Yes	–

Scientific Name	Species Name	BC List	COSEWIC	Bulkley	Kispiox	Morice	Zymoetz
–	Chub (General)	–	–	–	Yes	–	–
–	Cutthroat/Rainbow cross	–	–	Yes	Yes	–	–
–	Dace (General)	–	–	–	–	Yes	–
–	Lamprey (General)	–	–	Yes	Yes	Yes	–
–	Minnow (General)	–	–	Yes	Yes	Yes	–
–	Mottled Sculpin	–	–	Yes	–	–	–
–	Salmon (General)	–	–	Yes	Yes	Yes	Yes
–	Sculpin (General)	–	–	Yes	Yes	Yes	Yes
–	Squanga	–	–	–	Yes	–	–
–	Stickleback (General)	–	–	–	Yes	–	–
–	Sucker (General)	–	–	Yes	Yes	Yes	Yes
–	Verified DV BT hybrid	–	–	–	–	–	–
–	Whitefish (General)	–	–	Yes	Yes	Yes	Yes