

DRAFT

Programmatic Environmental Assessment

for

**Fisheries Research Conducted and Funded by the
Northwest Fisheries Science Center**

August 2015

Appendix B

**Spatial and Temporal Distribution of NWFSC Fisheries
Research Effort**



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Spatial and Temporal Distribution of NWFSC Fisheries Research Effort by Gear Type

This appendix provides a brief synopsis of NWFSC fisheries research effort under the Status Quo Alternative by gear type and by season for trawling, seining, miscellaneous fish nets, and longline fishing. Complete descriptions of the research efforts in the NWFSC research area are provided in Table 2.2-1. This appendix provides information about the spatio-temporal distribution of research effort in the NWFSC Research Area to complement the information provided in Table 2.2-1.

Table B-1 NWFSC Research Effort by Gear Type and Season in the CCRA

Gear type	Surveys	Gear Description	Sampling Events	Effort
California Current Research Area (CCRA)				
Spring (March-May)				
Bottom trawling	Bycatch reduction research	Commercial bottom trawls of various net sizes	40 bottom trawls/year (yr)	Up to 4 hour duration tows at 1.5-3.5 knots (kts) at depths of 50-1000 meters (m)
	Bycatch reduction research	Double rigged shrimp trawl of various net sizes	Up to 60 trawls/yr	30-80 minute duration tows at 1.5-3.5 kts and fished at depths of 50-1000 m
	Cameral trawl research	Poly Nor'easter Bottom Trawl (PNE)	Various	2.8-3.5 knot tows at variable depths and duration depending on time it takes to verify acoustic signal
	Groundfish bottom trawl survey	Modified Aberdeen bottom trawl of net size 5 x 15 m	737-773 trawls/yr	15 minute duration tows at 2.2 kts at depths of 55-1280 m
Midwater trawling	Bycatch reduction research	Commercial pelagic trawls of various net sizes	Up to 60 trawls/yr	Up to 8 hour duration tows at 1.5-3.5 kts and 500-1000 m depth
	Hake Acoustic Survey	AWT	150 trawls/yr	Variable duration tows at 2.8-3.5 kts at variable depths
	Camera trawl research (associated with hake acoustic survey)	Aleutian Wing Midwater Trawl (AWT)	40 trawls/yr	2.8-3.5 knot tows at depths down to 500 m
	Northern juvenile rockfish survey	Modified Cobb trawl with 9.5 mm codend and net size of 12 x 12 m	100 trawls/yr	15 minute duration tows at 2.7 kts at depths of 30-40 m
	PNW ichthyoplankton survey	Nordic 264 surface trawl of net size 30 x 20 m	40 trawls/yr	30 minute duration tows at 3 kts at depths of 30-50 m
Surface trawling	Juvenile salmon PNW coastal survey, PNW ichthyoplankton survey, PNW piscine predator and forage fish survey	Nordic 264 surface trawl of net size 30 x 20 m	88-180 trawls/yr	30 minute tows at 3-4 kts at depths down to 30 m

Gear type	Surveys	Gear Description	Sampling Events	Effort
Purse seine	Near coastal ocean purse seining	Purse seines with net size of 750 x 60ft or 1000 x 40ft and mesh size of 0.625 inches	75 sets/yr	1 hour duration sets
Longline	Aquaculture and physiology broodstock collection	750-1000 fathom mainline set at a depth of 700-3000 feet (ft)	30 sets/yr	3 hour soak time
Hook and line gear	Aquaculture and physiology broodstock collection	Rod and reel, barbed circle hooks	6 hours of fishing/day	90 hours total fishing time
Pot gear	Aquaculture and physiology broodstock collection	Sablefish pots	1 set/yr	Variable
Summer (June-August)				
Bottom trawling	Bycatch reduction research	Commercial bottom trawls of various net sizes fished at depths of 50-1000 m	40 bottom trawls/yr	Up to 4 hour duration tows at 1.5-3.5 kts
	Bycatch reduction research	Double rigged shrimp trawl of various net sizes fished at depths of 50-1000 m	Up to 60 trawls/yr	30-80 minute duration tows at 1.5-3.5 kts
	Groundfish bottom trawl survey	Modified Aberdeen bottom trawl of net size 5 x 15 m	737-773 trawls/yr	15 minute duration tows at 2.2 kts at depths of 55-1280 m
	Hake acoustic survey	PNE	150 trawls/yr	Variable duration tows at 2.8-3.5 kts at variable depths
Midwater trawling	Bycatch reduction research	Commercial pelagic trawls of various net sizes	Up to 60 trawls/yr	Up to 8 hour duration tows at 1.5-3.5 kts and 500-1000 m depth
	Hake acoustic survey	AWT	150 trawls/yr	Variable duration tows at 2.8-3.5 kts at variable depths
	Camera Trawl Research (associated with hake acoustic survey)	AWT	40 trawls/yr	Variable duration tows at 2.8-3.5 kts at depths down to 500 m
	Northern juvenile rockfish survey	Modified Cobb trawl with 9.5 mm codend and net size of 12 x	100 trawls/yr	15 minute duration tows at 2.7 kts at depths of 30-40 m

Gear type	Surveys	Gear Description	Sampling Events	Effort
		12 m		
	PNW ichthyoplankton survey	Nordic 264 surface trawl of net size 30 x 20 m	40 trawls/yr	30 minute duration tows at 3 kts at depths of 30-50 m
Surface trawling	Juvenile salmon PNW coastal survey, PNW ichthyoplankton survey, PNW piscine predator and forage fish survey	Nordic 264 surface trawl of net size 30 x 20 m	88 to 180 trawls/yr	30 minute tows at 3-4 kts at depths down to 30 m
Purse seine	Near coastal ocean purse seining	Purse seines with net size of 750 x 60ft or 1000 x 40ft and mesh size of 0.625 inches	75 sets/yr	1 hour duration sets
Longline	Aquaculture and physiology broodstock collection	750-1000 fathom mainline set at a depth of 700-3000 ft	30 sets/yr	3 hour soak time
Hook and line gear	Aquaculture and physiology broodstock collection	Rod and reel, barbed circle hooks	6 hours of fishing/day	90 hours total fishing time
Pot gear	Aquaculture and physiology broodstock collection	Sablefish pots	1 set/yr	Variable
Fall (September-November)				
Bottom trawling	Bycatch reduction research	Commercial bottom trawls of various net sizes fished at depths of 50-1000 m	40 bottom trawls/yr	Up to 4 hour duration tows at 1.5-3.5 kts
	Bycatch reduction research	Double rigged shrimp trawl of various net sizes fished at depths of 50-1000 m	Up to 60 trawls/yr	30-80 minute duration tows at 1.5-3.5 kts
	Cameral trawl research	Poly Nor'easter Bottom Trawl (PNE)	Various	2.8-3.5 knot tows at variable depths and duration depending on time it takes to verify acoustic signal
	Groundfish bottom trawl survey	Modified Aberdeen bottom	737-773 trawls/yr	15 minute duration tows at 2.2 kts at

Gear type	Surveys	Gear Description	Sampling Events	Effort
		trawl of net size 5 x 15 m		depths of 55-1280 m
	Hake acoustic survey	PNE	150 trawls/yr	Variable duration tows at 2.8-3.5 kts and fished at variable depths
Midwater trawling	Bycatch reduction research	Commercial pelagic trawls of various net sizes	Up to 60 trawls/yr	Up to 8 hour duration tows at 1.5-3.5 kts and 500-1000 m depth
	Hake acoustic survey	AWT	150 trawls/yr	Variable duration tows at 2.8-3.5 kts at variable depths
	Camera Trawl Research (associated with hake acoustic survey)	AWT	40 trawls/yr	Variable duration tows at 2.8-3.5 kts at depths down to 500 m
	PNW ichthyoplankton survey	Nordic 264 surface trawl of net size 30 x 20 m	40 trawls/yr	30 minute duration tows at 3 kts at depths of 30-50 m
Surface trawling	Juvenile salmon PNW coastal survey, PNW ichthyoplankton survey	Nordic 264 surface trawl of net size 30 x 20 m	180 trawls/yr, 88 trawls/yr	30 minute tows at 3-4 kts at depths down to 30 m
Purse seine	Near coastal ocean purse seining,	Purse seines with net size of 750 x 60ft or 1000 x 40ft and mesh size of 0.625 inches	75 sets/yr	1 hour duration sets
Longline	Aquaculture and physiology broodstock collection	750-1000 fathom mainline set at a depth of 700-3000 feet (ft)	30 sets/yr	3 hour soak time
Hook and line gear	Aquaculture and physiology broodstock collection	Rod and reel, barbed circle hooks	6 hours of fishing/day	90 hours total fishing time
	Southern California Groundfish hook and line survey	Rod and reel, 5 hooks per line	275 sites	5 sets per angler per site with a 5 minute maximum soak time at depths of 37-229 m
Pot gear	Aquaculture and physiology broodstock collection	Sablefish pots	1 set/yr	Variable
Winter (December-February)				
Hake acoustic survey	AWT	150 trawls/yr	Variable duration tows at 2.8-3.5 kts at variable depths	Hake acoustic survey

Gear type	Surveys	Gear Description	Sampling Events	Effort
Midwater trawling	Camera Trawl Research (associated with hake acoustic survey)	AWT	75 trawls/yr	Variable duration tows at 2.8-3.5 kts at depths down to 500 m
Longline	Aquaculture and physiology broodstock collection	750-1000 fathom mainline set at a depth of 700-3000 ft	30 sets/yr	3 hour soak time
Hook and line gear	Aquaculture and physiology broodstock collection	Rod and reel, barbed circle hooks	6 hours of fishing/day	90 hours total fishing time
Pot gear	Aquaculture and physiology broodstock collection	Sablefish pots	1 set/yr	Variable

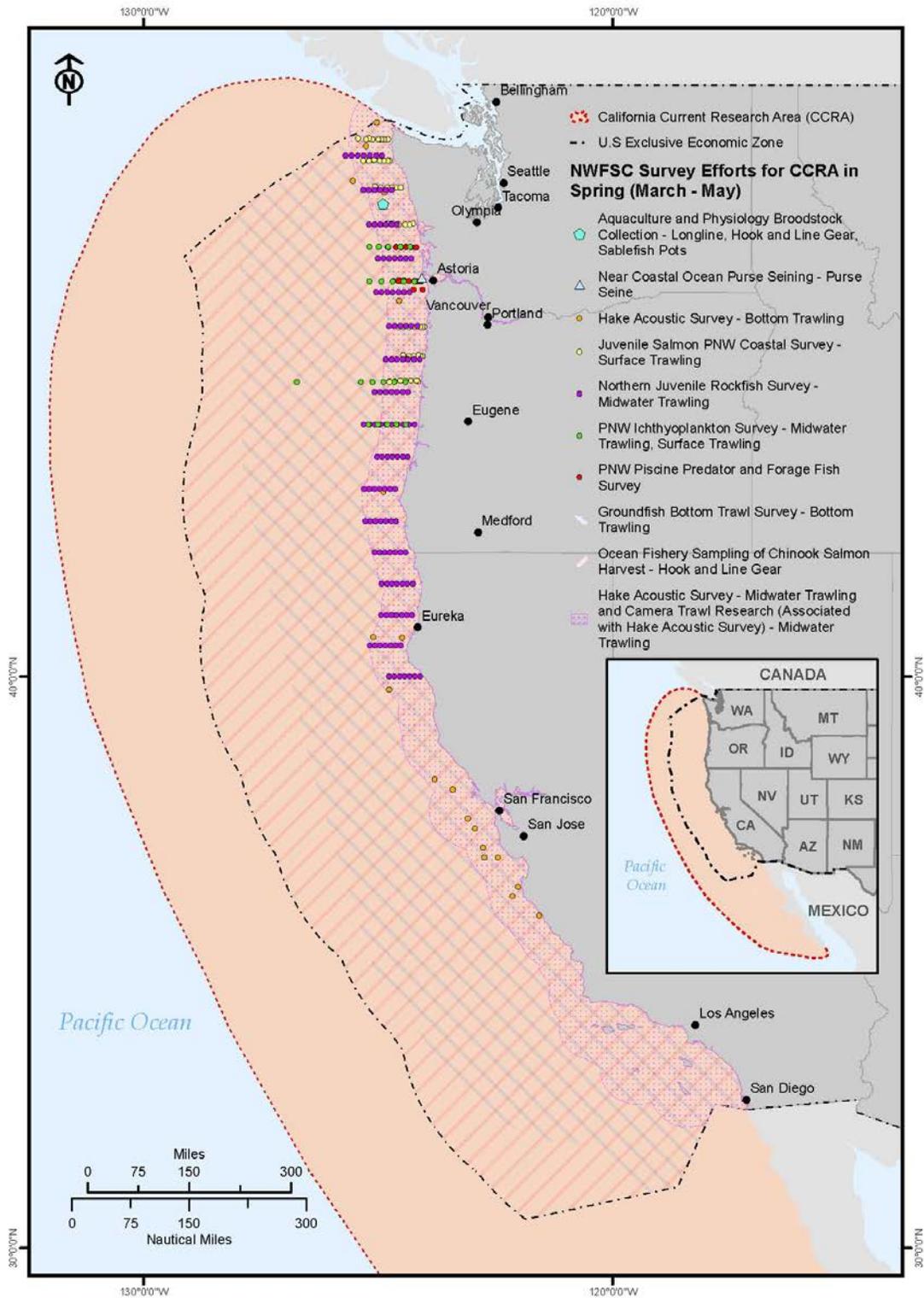


Figure B-1 Distribution of NWFS research effort in the CCRA in spring

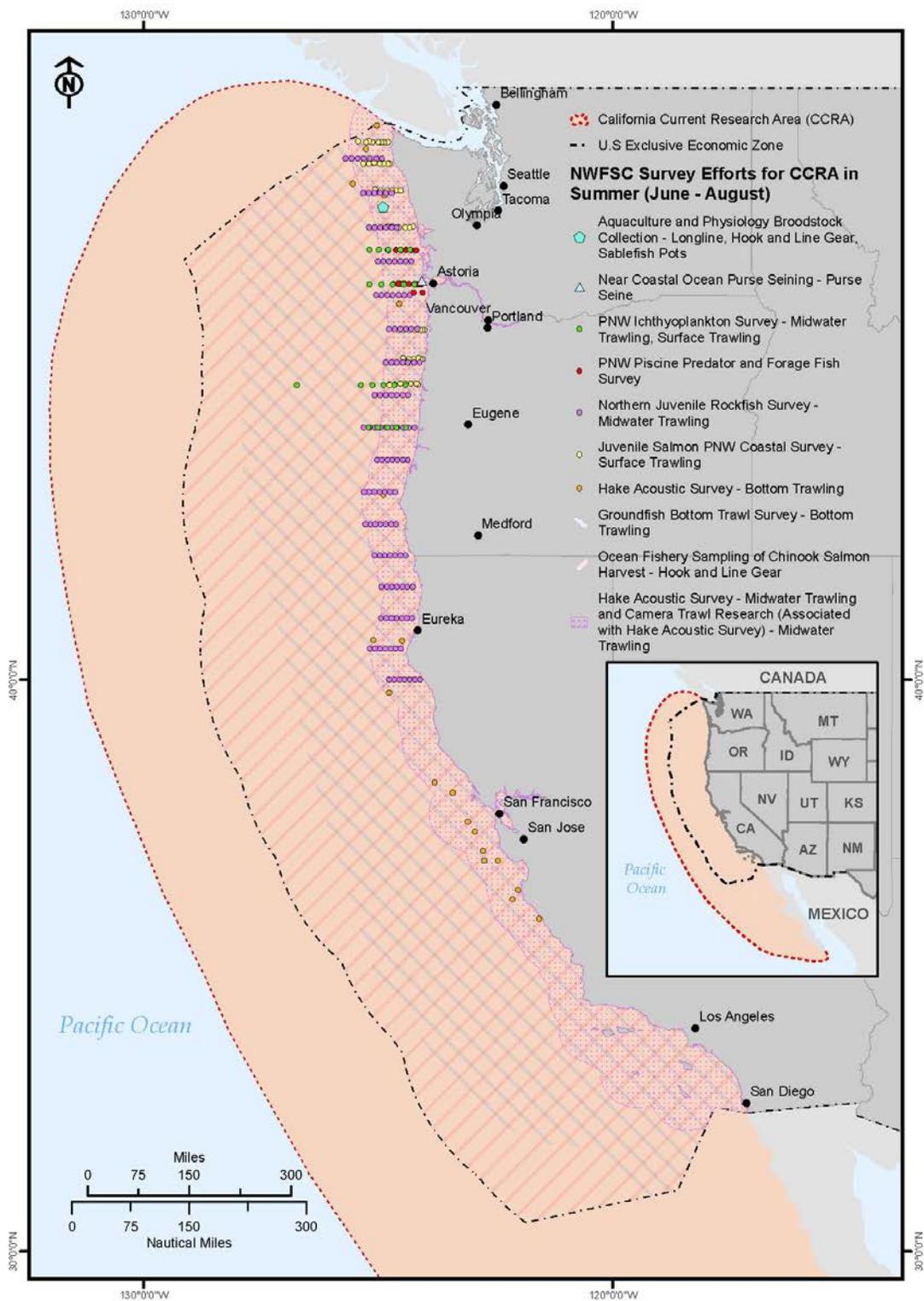


Figure B-2 Distribution of NWFSC research effort in the CCRA in summer

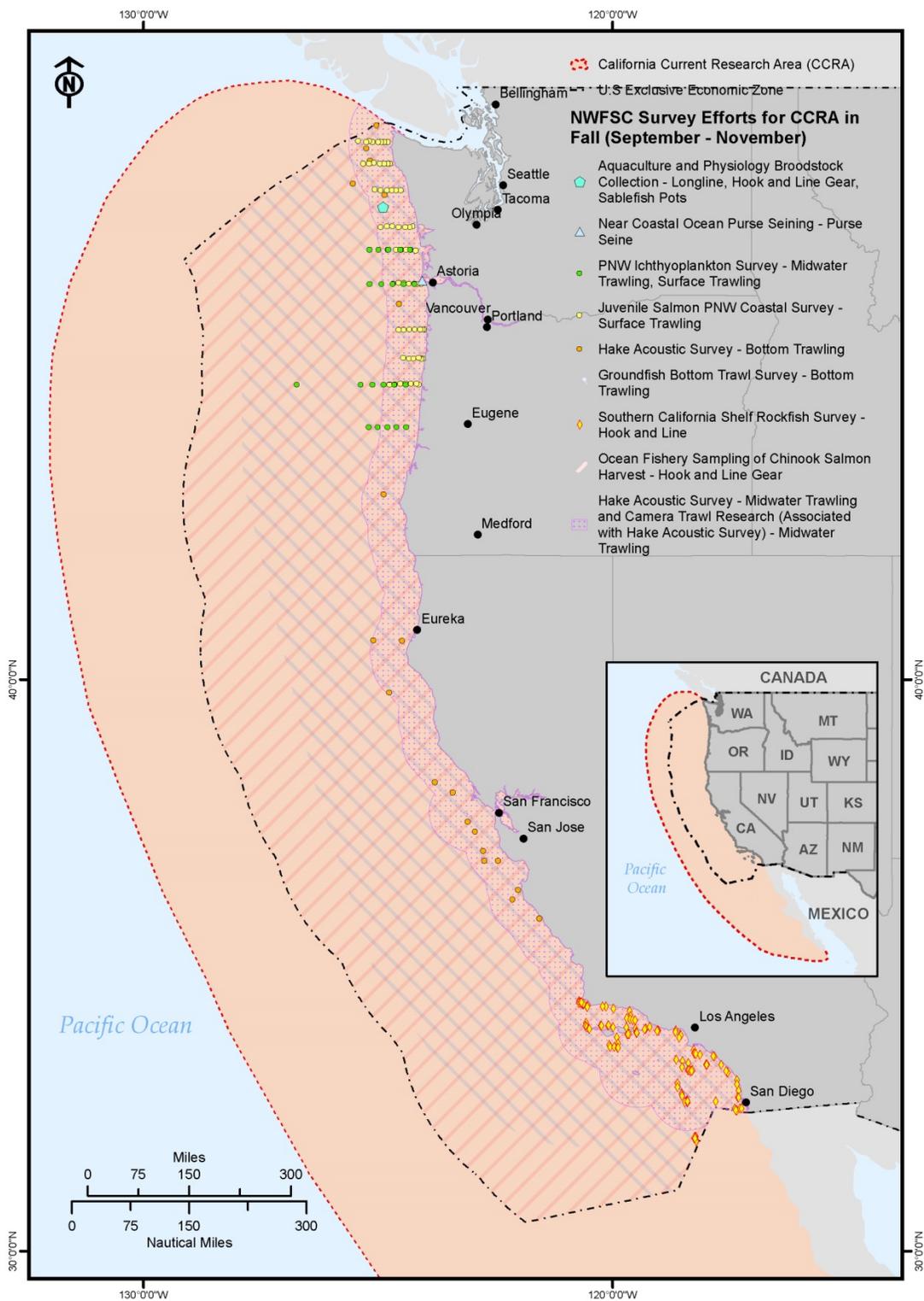


Figure B-3 Distribution of NWFS research effort in the CCRA in fall

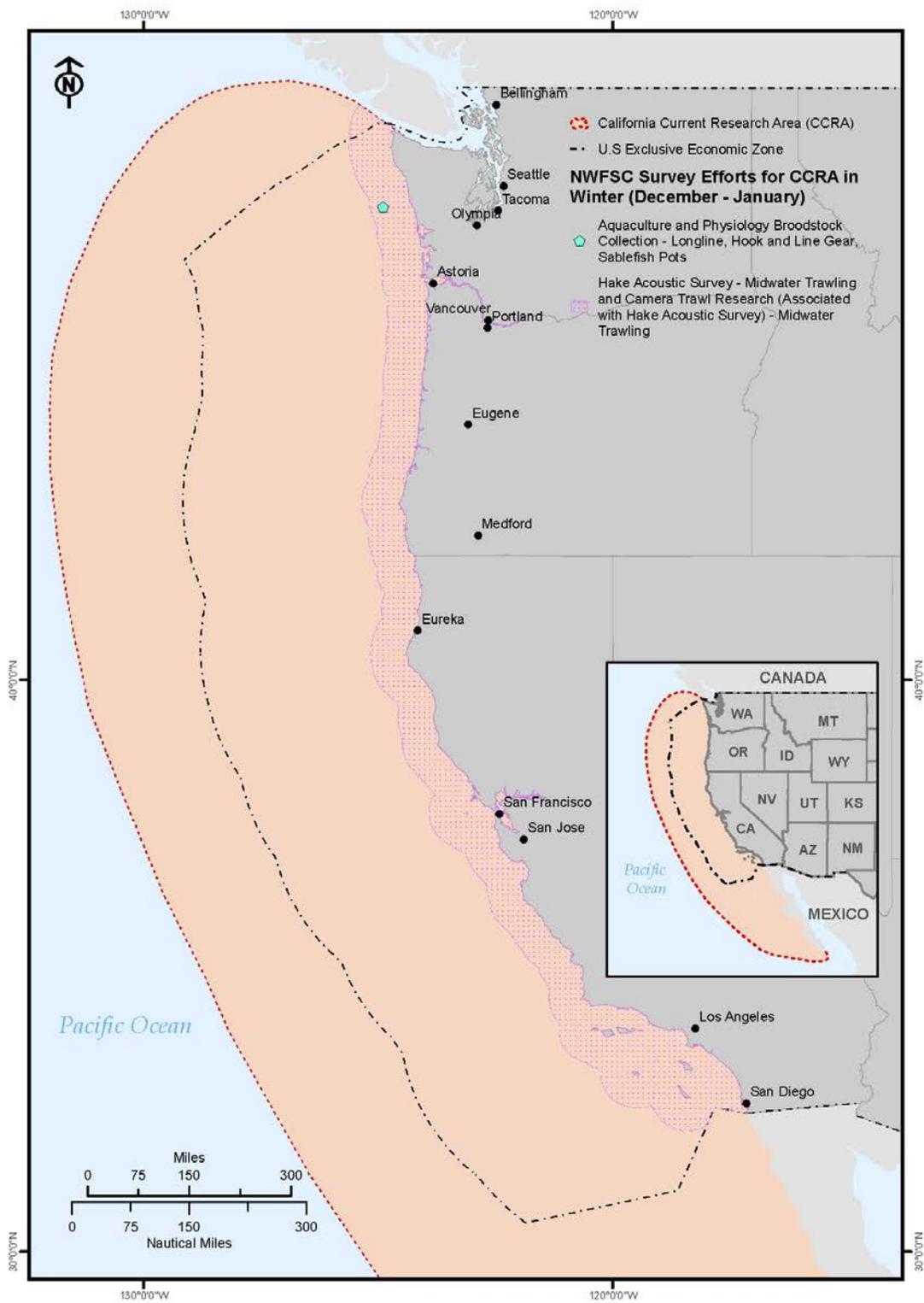


Figure B-4 Distribution of NWFSC research effort in the CCRA in winter

Table B-2 NWFSC Research Effort by Gear Type and Season in the LCRRA

Gear type	Surveys	Gear Description	Sampling Events	Effort
Lower Columbia River Research Area (LCRRA)				
Spring (March-May)				
Surface trawling	Pair trawl Columbia River juvenile salmon survey	Surface trawl modified with open cod end with wing size of 92 x 92 m	800-1200 hours/yr	8-15 hour duration tows at 1.5 kts from surface to 5 m depth
Purse and beach seine	Lower Columbia River estuary purse seining	Purse seines with net size of 500 x 30ft and mesh size of 0.34 inches	90 sets/yr	1 hour duration sets
	Columbia River estuary tidal habitats	Beach seine with 150 x 6 ft net size and 1.0 inch mesh size	< 100 sets/yr per survey	< 10 minute duration
Tangle nets	Migratory behavior of adult salmon	600 x 40 ft tangle nets with mesh size of 4.25 inches	Up to 75 sets/yr	25-45 minute duration sets
Fyke Trap	Columbia River estuary tidal habitats	Barrier trap with variable net sizes and <0.25 inch mesh	< 50 sets/yr	Up to 6 hour duration
Guidance net	Pike dike PIT tag detection system	Small guidance net anchored in place leading to an 8 x 20 ft opening; 36 inch square mesh	Continuous	continuous
Summer (June-August)				
Surface trawling	Pair trawl Columbia River juvenile salmon survey	Surface trawl modified with open cod end with wing size of 92 x 92 m	800-1200 hours/yr	8-15 hour duration tows at 1.5 kts from surface to 5 m depth
Purse and beach seine	Lower Columbia River estuary purse seining	Purse seines with net size of 500 x 30ft and mesh size of 0.34 inches	90 sets/yr	1 hour duration sets

Gear type	Surveys	Gear Description	Sampling Events	Effort
	Columbia River estuary tidal habitats	Beach seine with 150 x 6 ft net size and 1.0 inch mesh size	< 100 sets/yr per survey	< 10 minute duration
Tangle Nets	Migratory behavior of adult salmon	600 x 40 ft tangle nets with mesh size of 4.25 inches	Up to 75 sets/yr	25-45 minute duration sets
Fyke Trap	Columbia River estuary tidal habitats	Barrier trap with variable net sizes and <0.25 inch mesh	< 50 sets/yr	Up to 6 hour duration
Guidance net	Pike dike PIT tag detection system	Small guidance net anchored in place leading to an 8 x 20 ft opening; 36 inch square mesh	Continuous	continuous
Fall (September-November)				
Surface trawling	Pair trawl Columbia River juvenile salmon survey	Surface trawl modified with open cod end with wing size of 92 x 92 m	800-1200 hours/yr	8-15 hour duration tows at 1.5 kts from surface to 5 m depth
Purse and beach seine	Lower Columbia River estuary purse seining	Purse seines with net size of 500 x 30ft and mesh size of 0.34 inches	90 sets/yr	1 hour duration sets
	Columbia River estuary tidal habitats	Beach seine with 150 x 6 ft net size and 1.0 inch mesh size	< 100 sets/yr per survey	< 10 minute duration
Tangle Nets	Migratory behavior of adult salmon	600 x 40 ft tangle nets with mesh size of 4.25 inches	Up to 75 sets/yr	25-45 minute duration sets
Guidance net	Pike dike PIT tag detection system	Small guidance net anchored in place leading to an 8 x 20 ft opening; 36 inch square mesh	Continuous	continuous
Winter (December-February)				
Purse and Beach Seine	Columbia River estuary tidal habitats	Beach seine with 150 x 6 ft net size and 1.0 inch mesh size	< 100 sets/yr per survey	< 10 minute duration
Fyke Trap	Columbia River estuary tidal habitats	Barrier trap with variable net sizes and <0.25 inch mesh	< 50 sets/yr	Up to 6 hour duration

Gear type	Surveys	Gear Description	Sampling Events	Effort
Guidance net	Pike dike PIT tag detection system	Small guidance net anchored in place leading to an 8 x 20 ft opening; 36 inch square mesh	Continuous	continuous

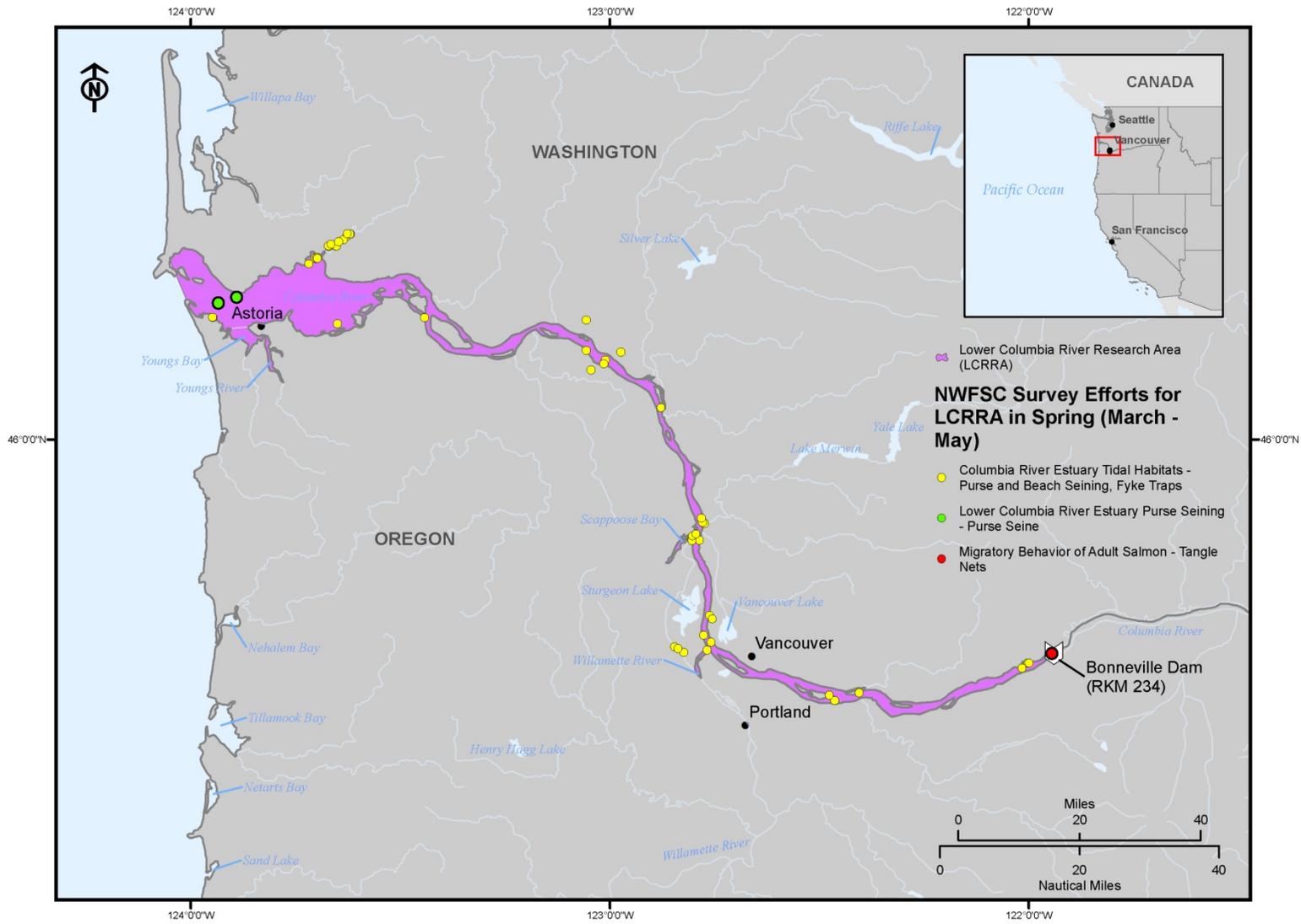


Figure B-5 Distribution of NWFSC research effort in the LCRRA in spring

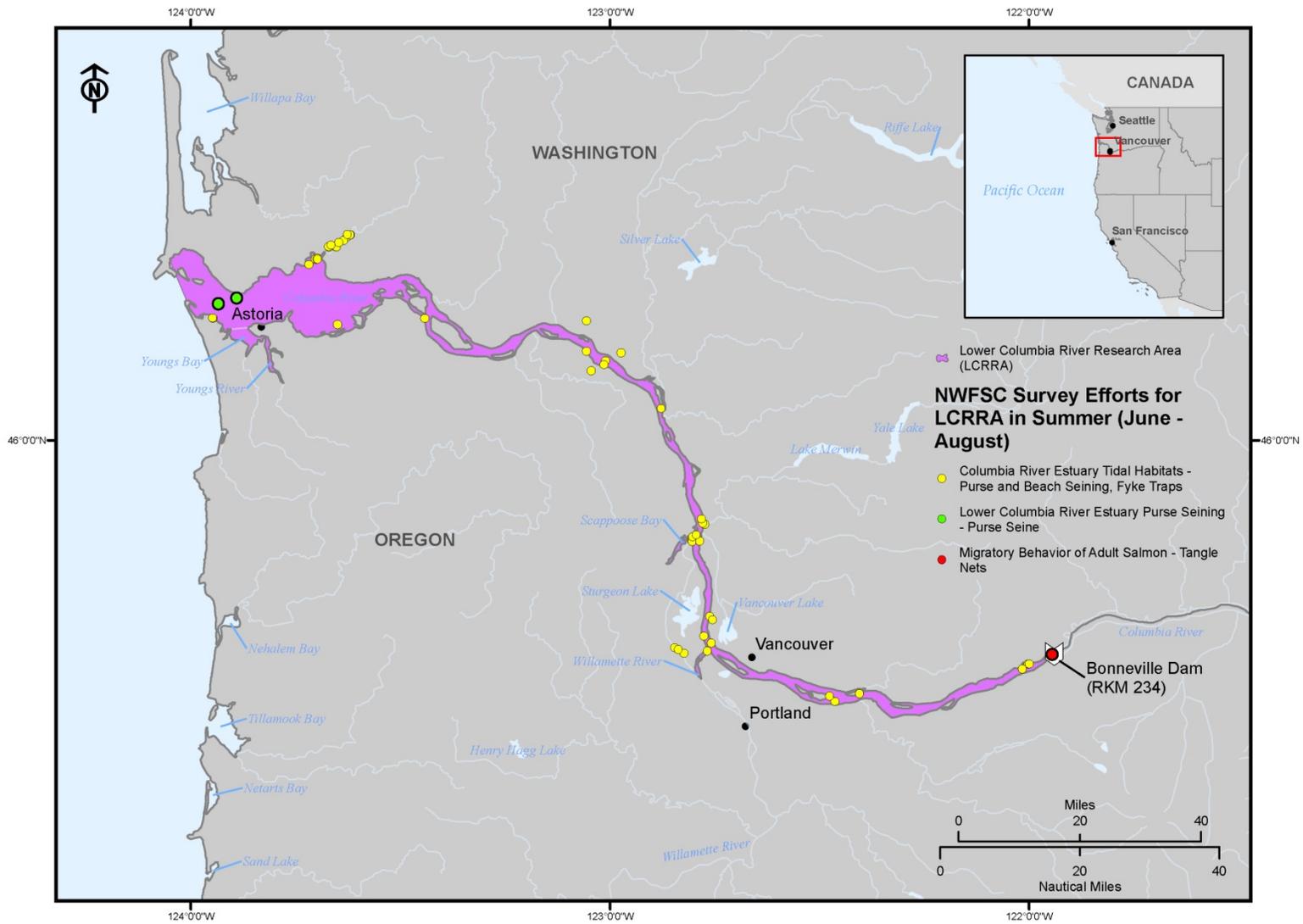


Figure B-6 Distribution of NWFSC research effort in the LCRRA in summer

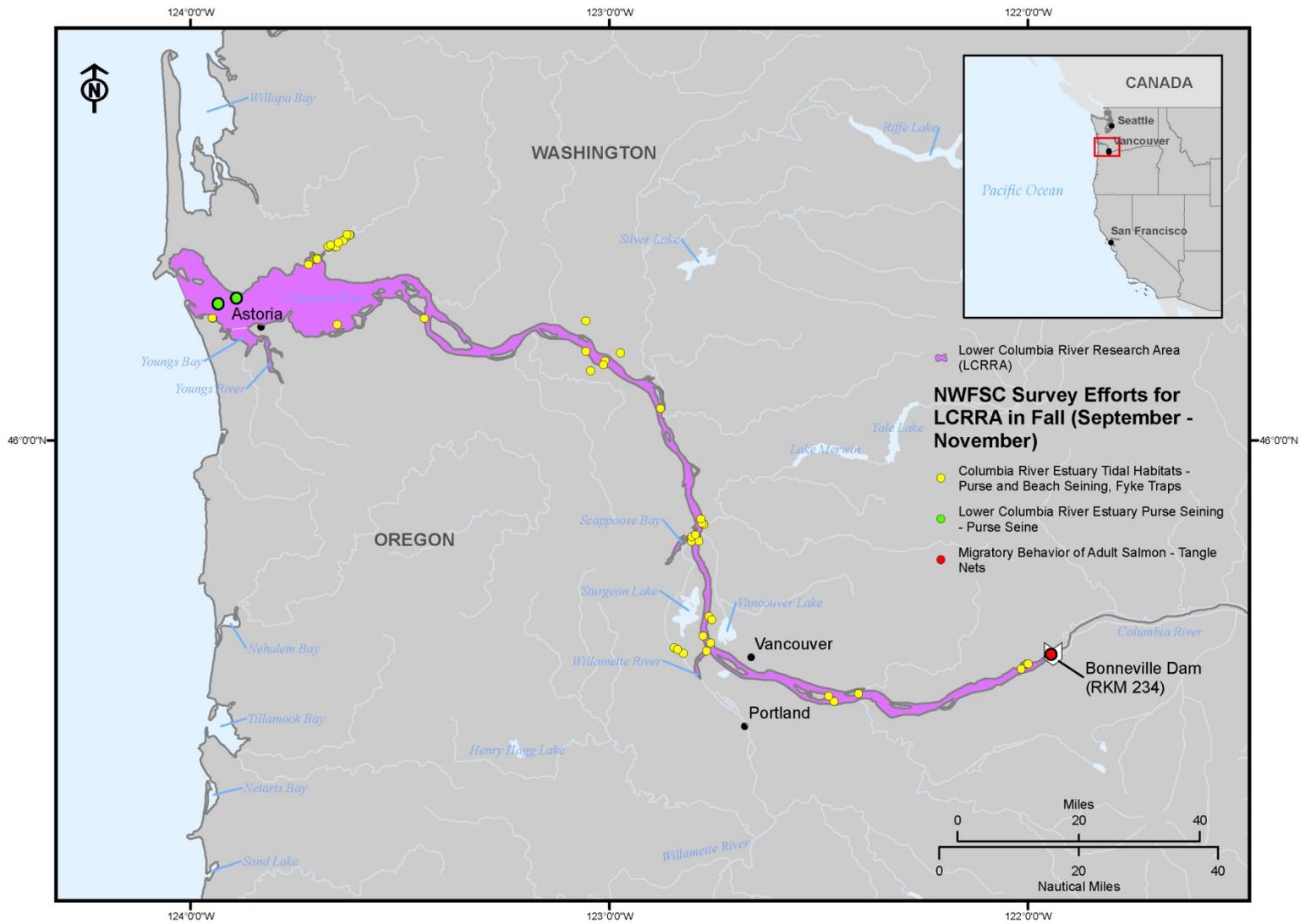


Figure B-7 Distribution of NWFS research effort in the LCRRA in fall

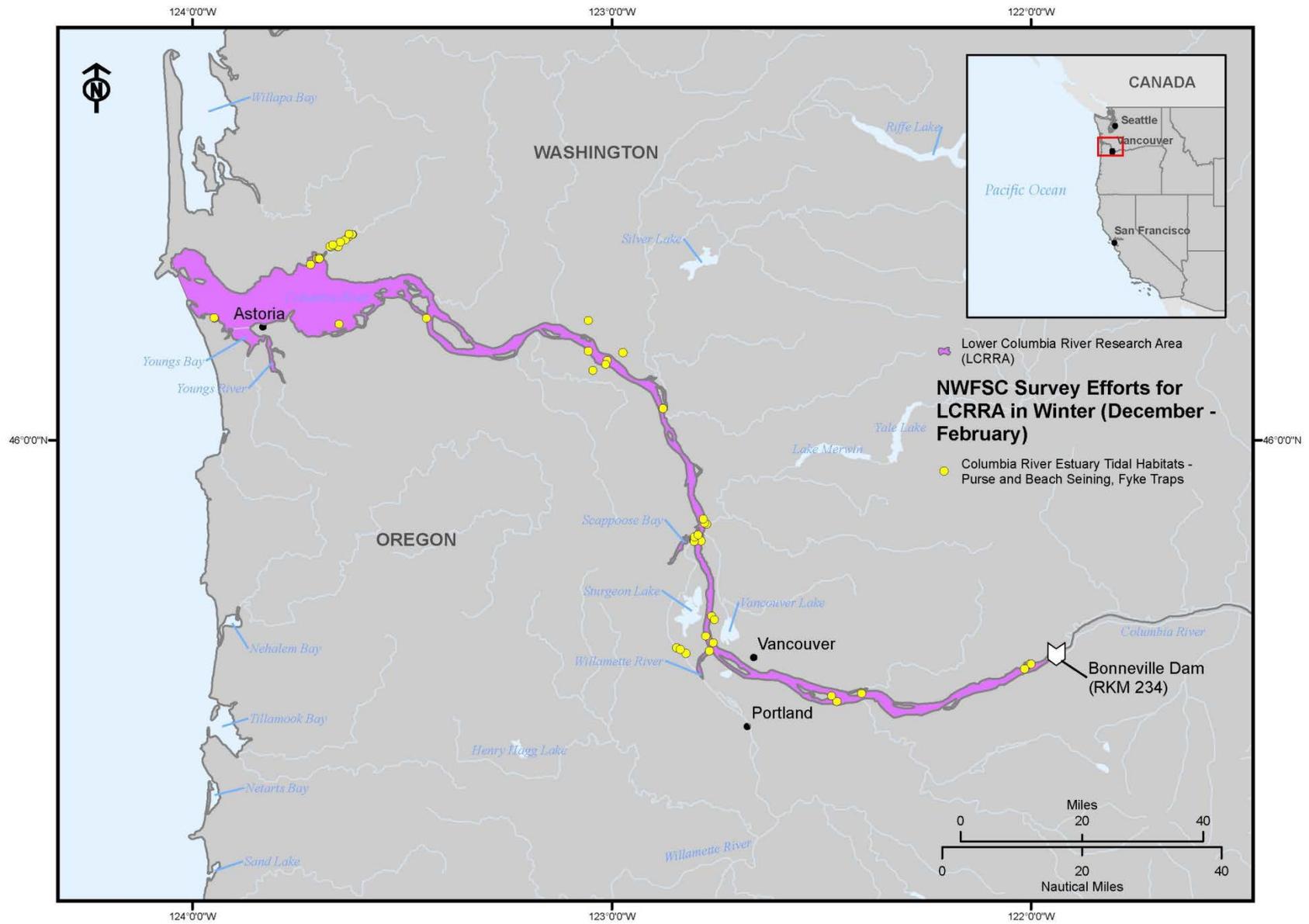


Figure B-8 Distribution of NWFSC research effort in the LCRRA in winter

Table B-3 NWFSC Research Effort by Gear Type and Season in the PSRA

Gear type	Surveys	Gear Description	Sampling Events	Effort
Puget Sound Research Area (PSRA)				
Spring (March-May)				
Bottom trawling	Movement studies of Puget Sound species	Commercial bottom trawls of various net sizes	12 trawls/yr	10 minute duration tows at 3.5 kts at > 10 m depths
	Puget Sound marine pelagic food web, Skagit Bay juvenile salmon survey	Kodiak surface trawl with net size of 3.1 x 6.1 m	250-500 trawls/yr	10 minute duration tows at 1.8-2.2 kts at depths <10 m
Beach and purse seine	Movement studies of Puget Sound species	Herring seine with net size of 1500 x 90 ft with variable mesh size	12 sets/yr	< 1 hour duration sets at < 50 m depths
	Elwha Dam removal, Snohomish juvenile salmon studies,	Beach seine with 140 x 6 ft net size and 0.25-1.0 inch mesh size	Up to 200 sets/yr per survey	< 10 minute duration
Pole Seine	Snohomish juvenile salmon studies Puget Sound marine biodiversity studies	Pole seine with 140 x 6 ft net size and < 1 inch mesh; benthic settling plates	80 sets/yr	< 5 minute duration
Fyke Trap	Snohomish juvenile salmon studies	Barrier trap with variable net sizes and <0.25 inch mesh	Up to 100 sets/yr	Up to 6 hour duration
Hook and line gear	Movement studies of Puget Sound species	Rod and reel, barbless hooks	10 trips/yr	Various
Summer (June-August)				
Bottom trawling	Movement studies of Puget Sound species	Commercial bottom trawls of various net sizes	12 trawls/yr	10 minute duration tows at 3.5 kts at > 10 m depths
Surface trawling	Puget Sound marine pelagic food web, Skagit Bay juvenile salmon survey	Kodiak surface trawl with net size of 3.1 x 6.1 m	250-500 trawls/yr	10 minute duration tows at 1.8-2.2 kts at depths <10 m
Purse and beach seine	Movement studies of Puget Sound species	Herring seine with net size of 1500 x 90 ft with variable mesh size	12 sets/yr	< 1 hour duration sets at < 50 m depths

Gear type	Surveys	Gear Description	Sampling Events	Effort
	Elwha Dam removal, Snohomish juvenile salmon studies	Beach seine with 140 x 6 ft net size and 0.25-1.0 inch mesh size	Up to 200 sets/yr per survey	< 10 minute duration
Pole Seine	Snohomish juvenile salmon studies Puget Sound marine biodiversity studies	Pole seine with 140 x 6 ft net size and < 1 inch mesh; settling plates	80 sets/yr	< 5 minute duration
Fyke Trap	Snohomish juvenile salmon studies	Barrier trap with variable net sizes and <0.25 inch mesh	Up to 100 sets/yr	Up to 6 hour duration
Hook and line gear	Movement studies of Puget Sound species	Rod and reel, barbless hooks	10 trips/yr	Various
Fall (September-November)				
Bottom trawling	Movement studies of Puget Sound species	Commercial bottom trawls of various net sizes	12 trawls/yr	10 minute duration tows at 3.5 kts at > 10 m depths
Midwater trawling	Puget Sound marine pelagic food web, Skagit Bay juvenile salmon survey	Kodiak surface trawl with net size of 3.1 x 6.1 m	250-500 trawls/yr	10 minute duration tows at 1.8-2.2 kts at depths <10 m
Purse and beach seine	Movement studies of Puget Sound species	Herring seine with net size of 1500 x 90 ft with variable mesh size	12 sets/yr	< 1 hour duration sets at < 50 m depths
	Elwha Dam removal, Snohomish juvenile salmon studies	Beach seine with 140 x 6 ft net size and 0.25-1.0 inch mesh size	Up to 200 sets/yr per survey	< 10 minute duration
Pole Seine	Snohomish juvenile salmon studies Puget Sound marine biodiversity studies	Pole seine with 140 x 6 ft net size and < 1 inch mesh; benthic settling plates	80 sets/yr	< 5 minute duration
Fyke Trap	Snohomish juvenile salmon studies	Barrier trap with variable net sizes and <0.25 inch mesh	Up to 100 sets/yr	Up to 6 hour duration
Hook and line gear	Movement studies of Puget Sound species	Rod and reel, barbless hooks	10 trips/yr	Various

Gear type	Surveys	Gear Description	Sampling Events	Effort
Winter (December-February)				
Bottom Trawling	Movement studies of Puget Sound species	Commercial bottom trawls of various net sizes	12 trawls/yr	10 minute duration tows at 3.5 kts at > 10 m depths
Purse and beach seine	Movement studies of Puget Sound species	Herring seine with net size of 1500 x 90 ft with variable mesh size	12 sets/yr	< 1 hour duration sets at < 50 m depths
Pole Seine	Snohomish juvenile salmon studies	Pole seine with 140 x 6 ft net size and < 1 inch mesh	80 sets/yr	< 5 minute duration
Fyke Trap	Snohomish juvenile salmon studies	Barrier trap with variable net sizes and <0.25 inch mesh	Up to 100 sets/yr	Up to 6 hour duration
Hook and line gear	Movement studies of Puget Sound species	Rod and reel, barbless hooks	10 trips/yr	Various

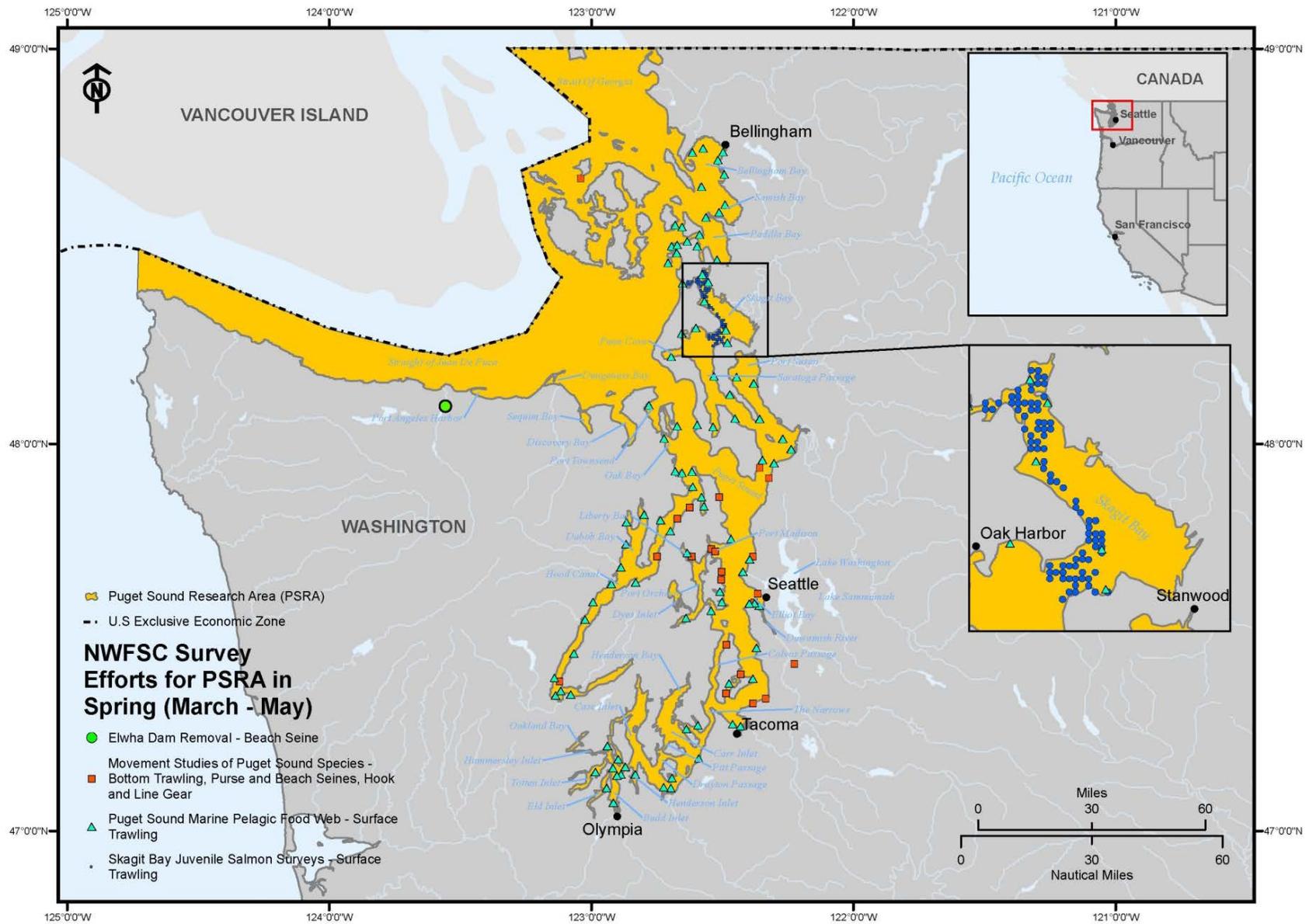


Figure B-9 Distribution of NWFSC research effort in the PSRA in spring

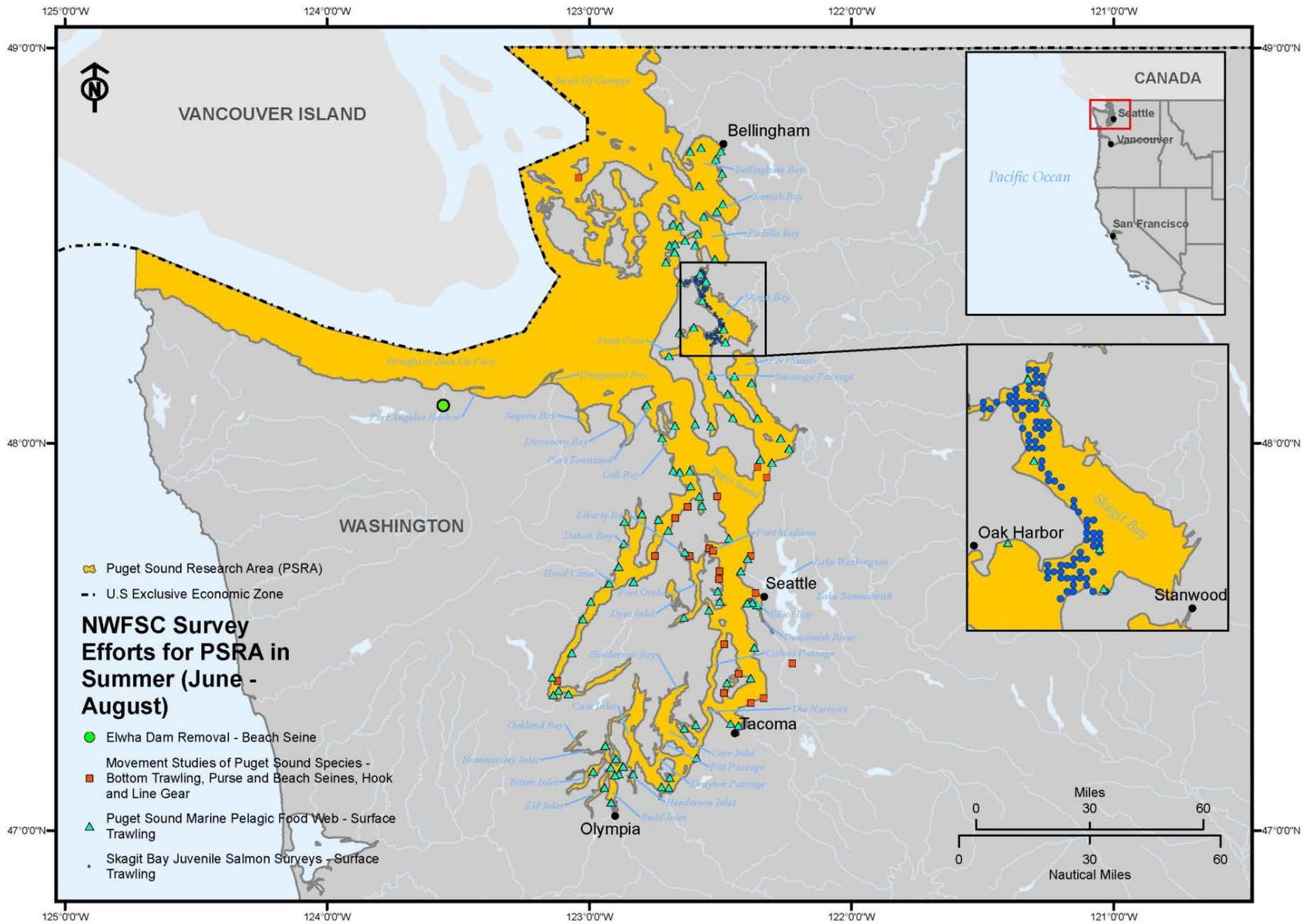


Figure B-10 Distribution of NWFSC research effort in the PSRA in summer

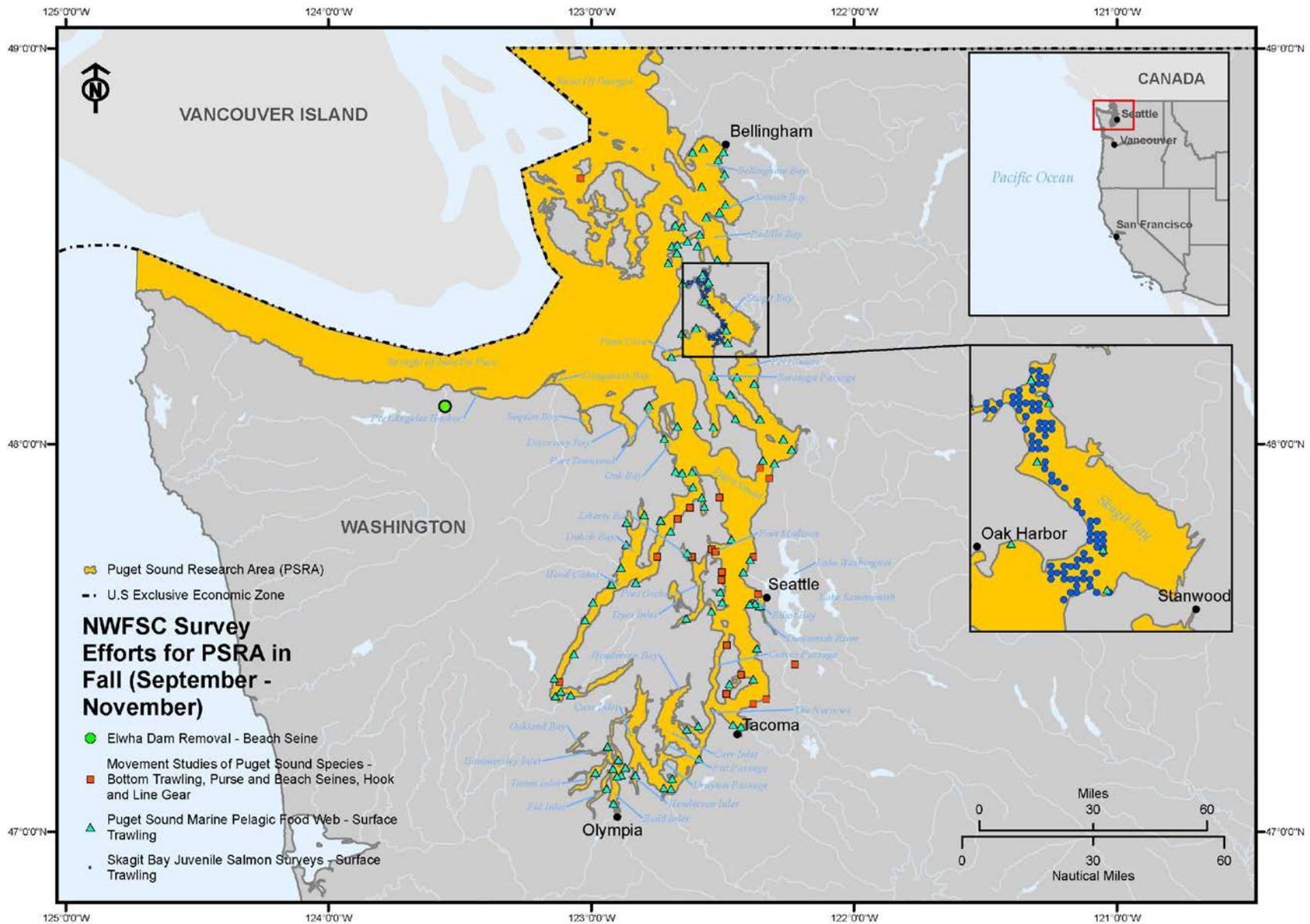


Figure B-11 Distribution of NWFSC research effort in the PSRA in fall

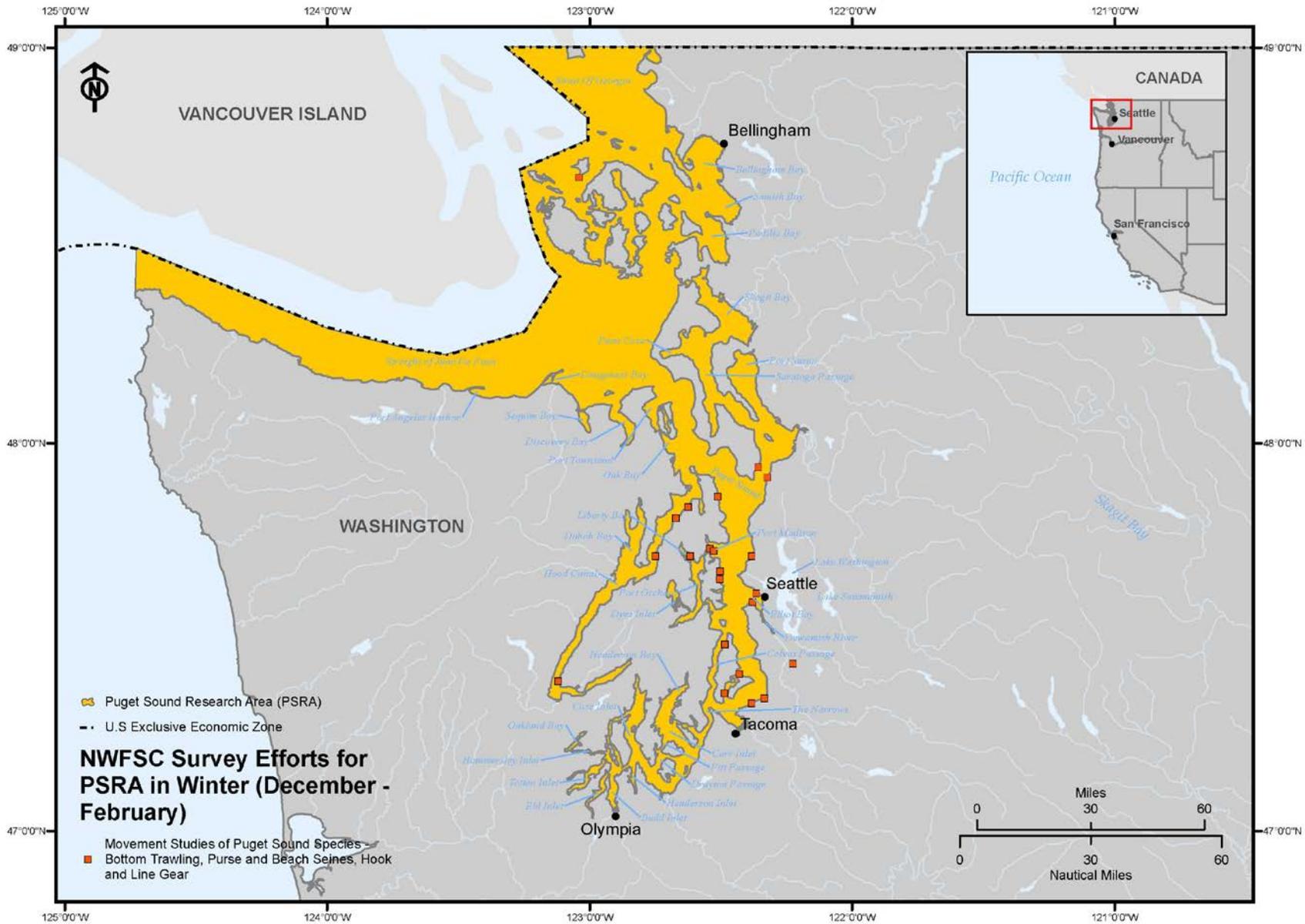


Figure B-12 Distribution of NWFS research effort in the PSRA in winter