Estimation of Juvenile Salmonid Survival from Bonneville Dam Through the Columbia River Estuary Using Acoustic Tags, Objective 3:

Field Evaluation of a Three-dimensional Mobile Tracking System

R. L. McComas
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COTR: Bliane Ebberts

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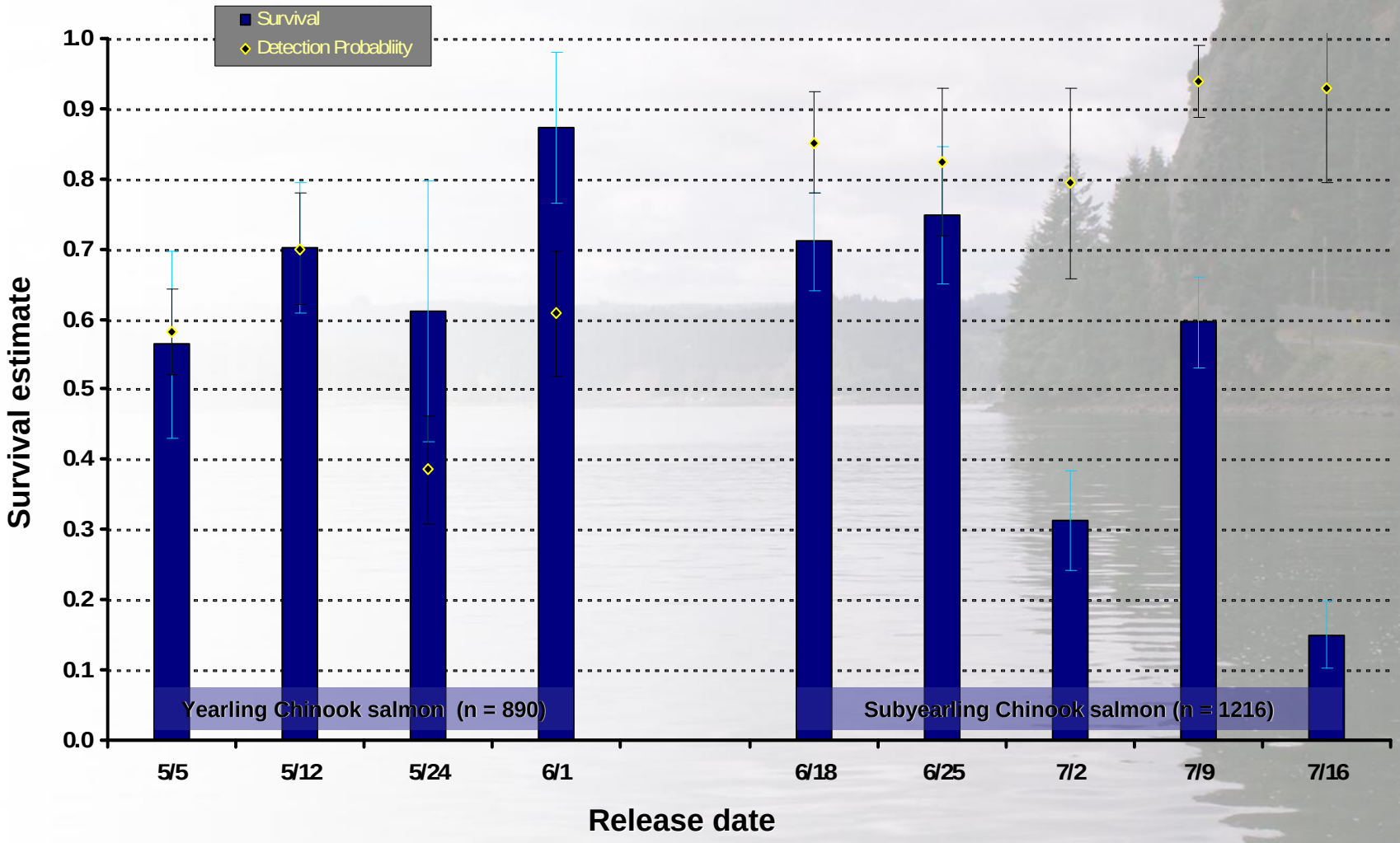

Juvenile Chinook salmon survival and detection probability estimates (± 95% CI) Bonneville Dam through the Columbia River estuary, 2005.

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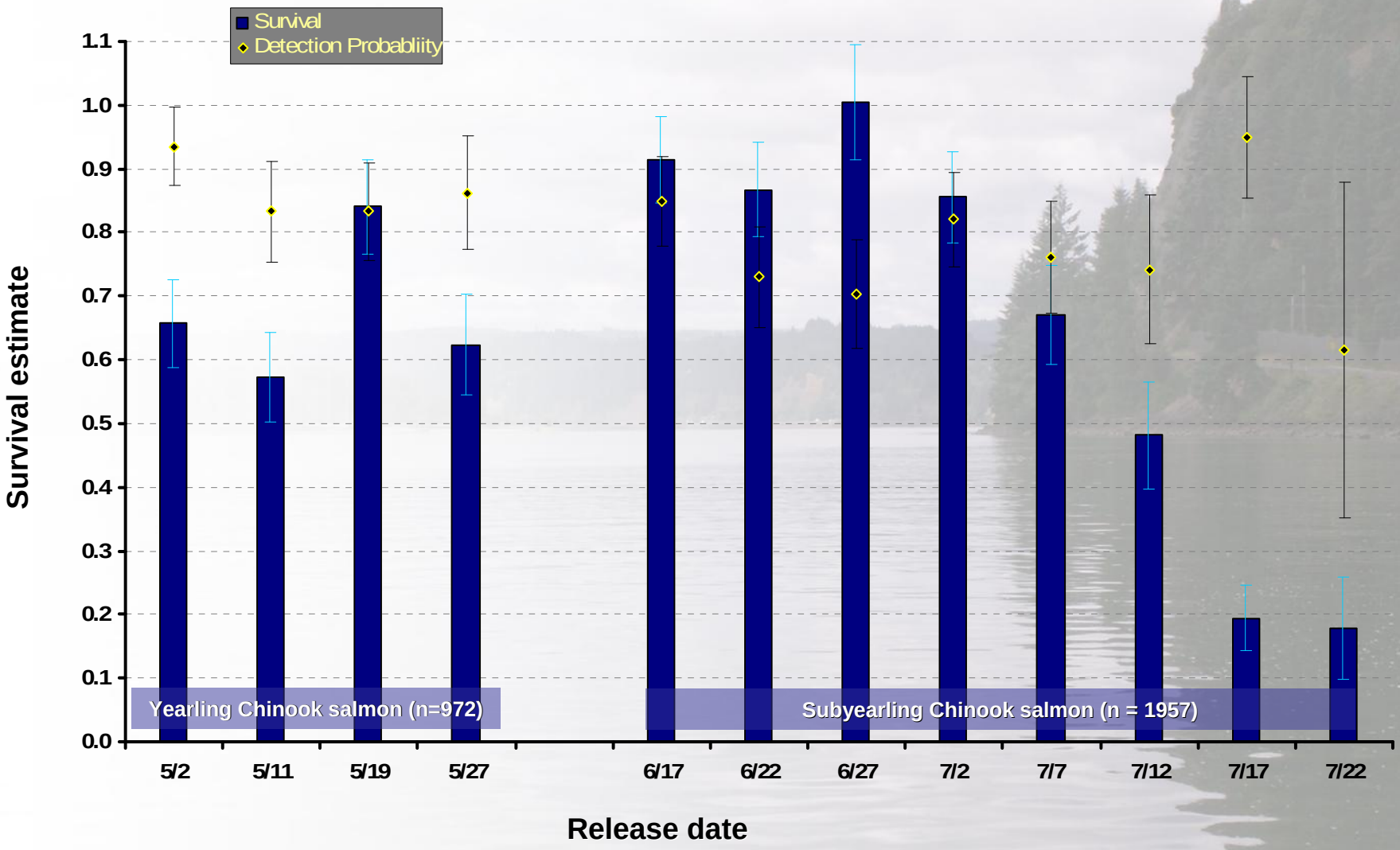

Juvenile Chinook salmon survival and detection probability estimates (± 95% CI) Bonneville Dam through the Columbia River estuary, 2006.

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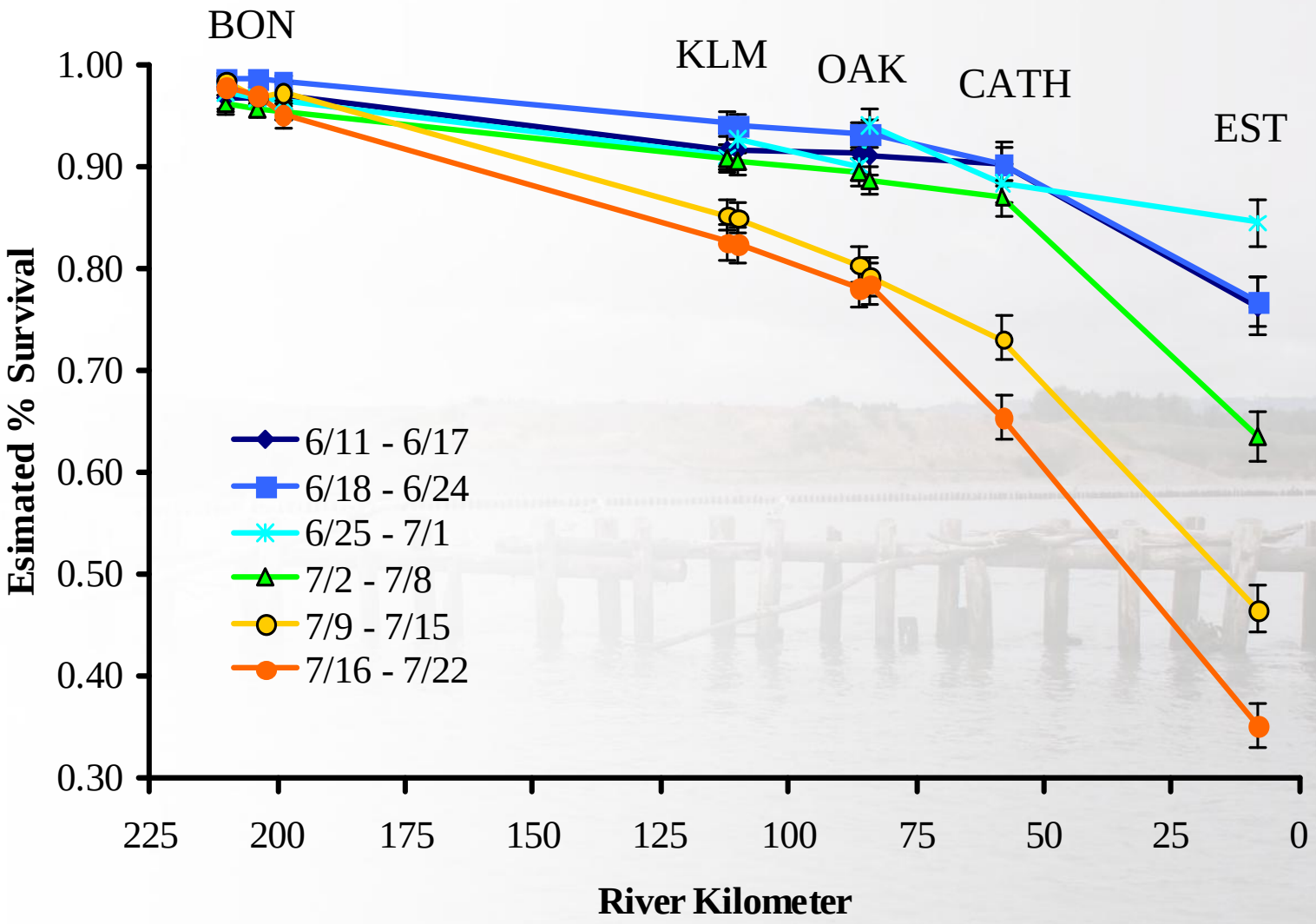

Juvenile Chinook salmon survival estimates, Bonneville Dam through the Columbia River estuary, 2007.

Subyearling Chinook salmon

Higher initial Post-FCRPS survival, dropping to <0.35

- Beginning of decline ~1 July
- Possible causes for decline:
  - Later migrating fish experiencing increased natural mortality
  - Increasing mortality from synergism of environmental conditions (water temperature?) and tagging effects
  - Ability to detect tagged fish diminishes through time; fish emigrate after tags expire

Fate determination methods

- System partitioning – full or partial transects
- Mobile tracking

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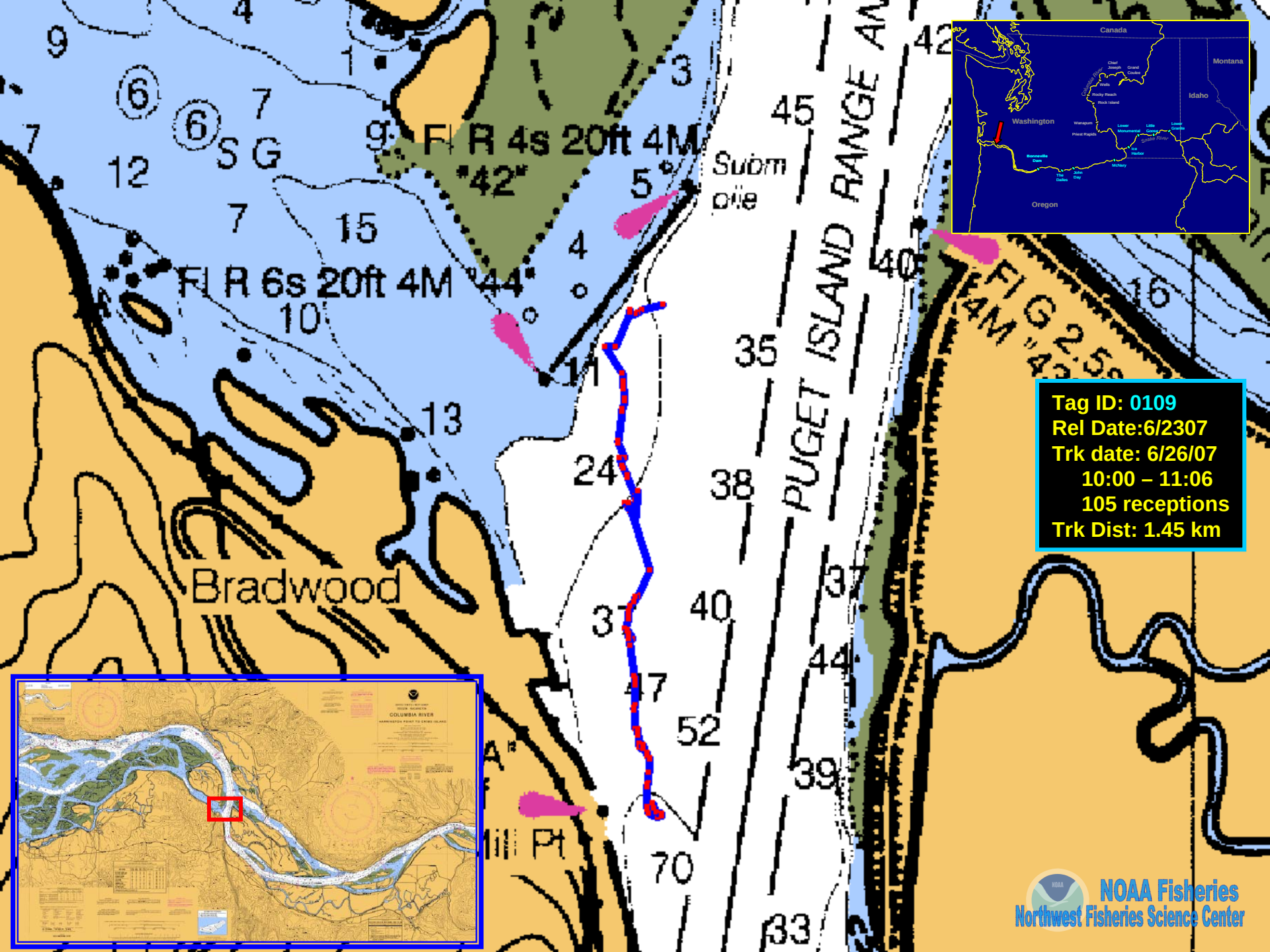
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Rel Date:6/2307
Trk date: 6/26/07
10:00 – 11:06
105 receptions
Trk Dist: 1.45 km
Fl R 4s 20ft 4M "42"
Fl R 6s 20ft 4M "44"
Fl G 2.5s 4M "43"
Submarine pile
PUGET ISLAND RANGE
Bradwood
Mill Pt
Canada
Montana
Idaho
Washington
Oregon
Chief Joseph
Grand Coulee
Wells
Rocky Reach
Rock Island
Columbia River
Snake River
Winapum
Priest Rapids
Lower Monumental
Little Goose
Lower Granite
Ice Harbor
McNary
Bonneville Dam
The Dalles
John Day
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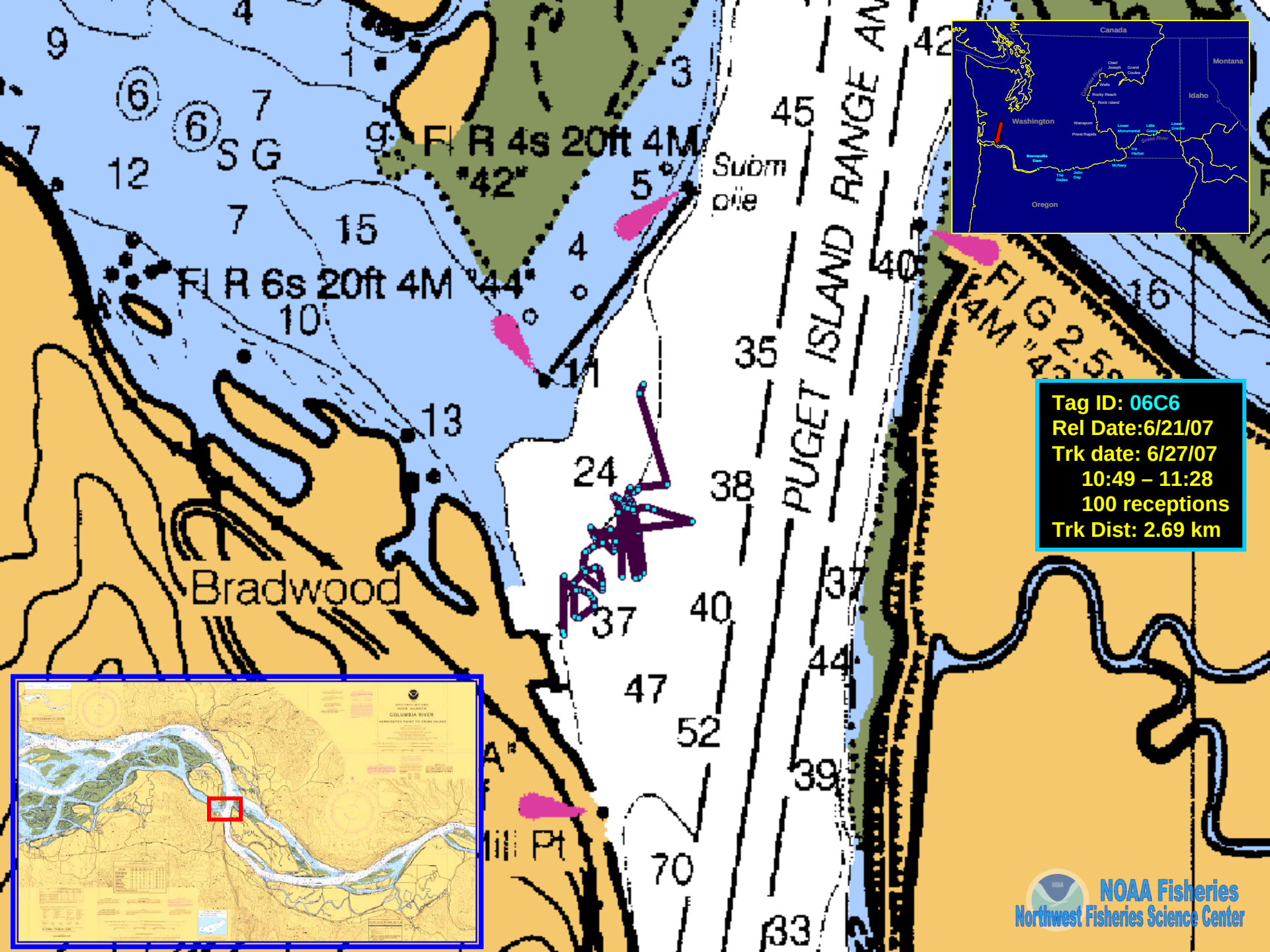
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Trk date: 6/27/07
10:49 – 11:28
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Trk Dist: 2.69 km
Fl R 4s 20ft 4M "42"
Fl R 6s 20ft 4M "44"
Subm pile
PUGET ISLAND RANGE
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Mill Pt
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Montana
Idaho
Washington
Oregon
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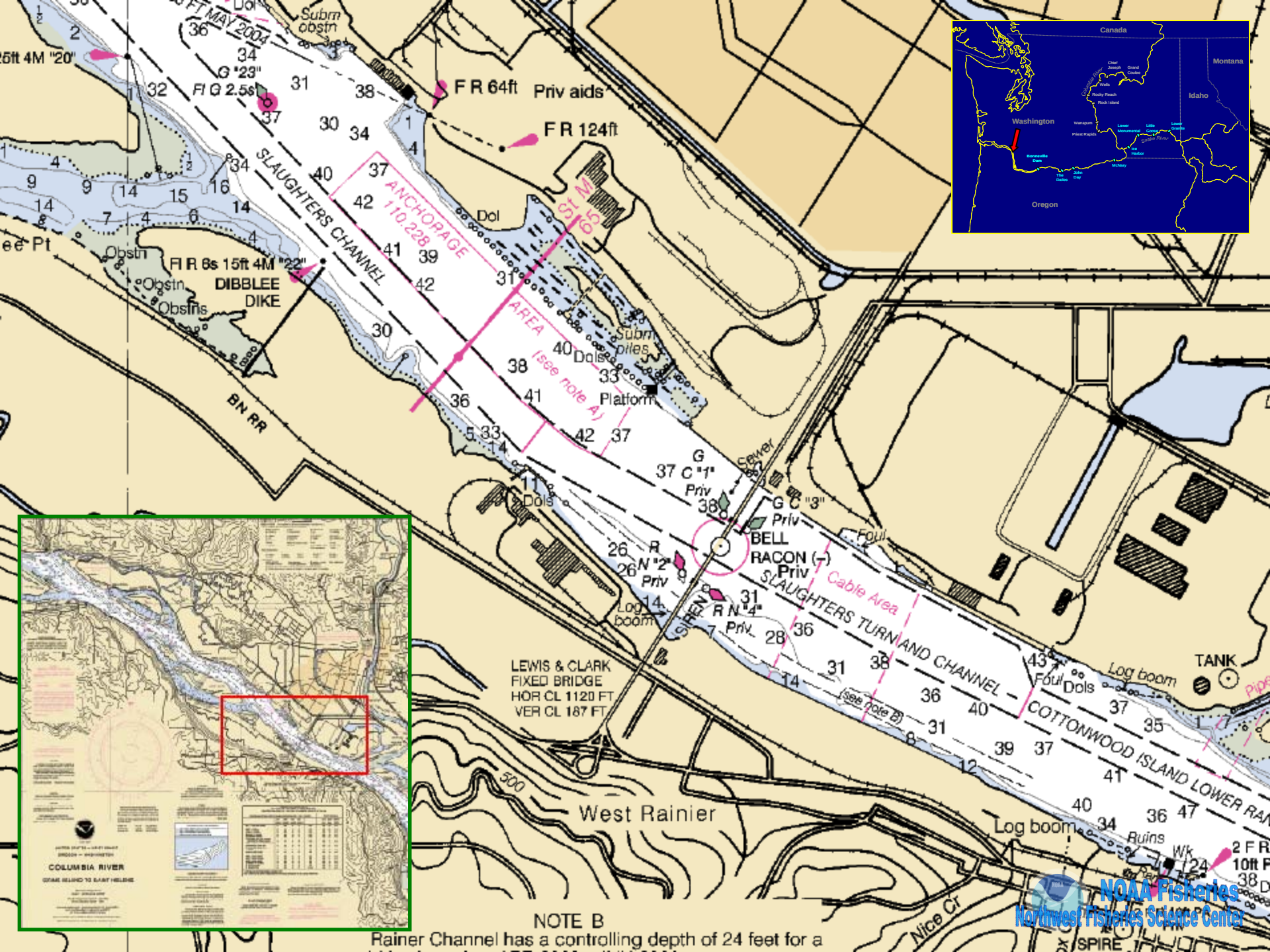

NOTE B

Rainer Channel has a controlling depth of 24 feet for a

Canada
Montana
Idaho
Washington
Oregon
Chief Joseph
Grand Coulee
Wells
Rocky Reach
Rock Island
Wanapum
Priest Rapids
Lower Monumental
Little Goose
Lower Granite
Snake River
Ice Harbor
McNary
Bonneville Dam
The Dalles
John Day
Columbia River
F R 64ft
Priv aids
F R 124ft
G "23"
Fl G 2.5s
SLAUGHTERS CHANNEL
ANCHORAGE 110,228
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(see note A)
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Subm piles
Platfo
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G C "3"
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RACON (–)
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Foul
R N "2"
Priv
R N "4"
Priv
Log boom
SIREN
SLAUGHTERS TURN AND CHANNEL
COTTONWOOD ISLAND LOWER RA
(see note B)
LEWIS & CLARK
FIXED BRIDGE
HOR CL 1120 FT
VER CL 187 FT
West Rainier
Log boom
TANK
Ruins
Wk
Nice Cr
SPIRE
COLUMBIA RIVER
NOTE B
Rainer Channel has a controlling depth of 24 feet for a
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Log boom
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Foul
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Ruins
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West Rainier
LEWIS & CLARK
FIXED BRIDGE
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VER CL 187 FT
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Fl G 2.5s
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COLUMBIA RIVER
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COLUMBIA RIVER
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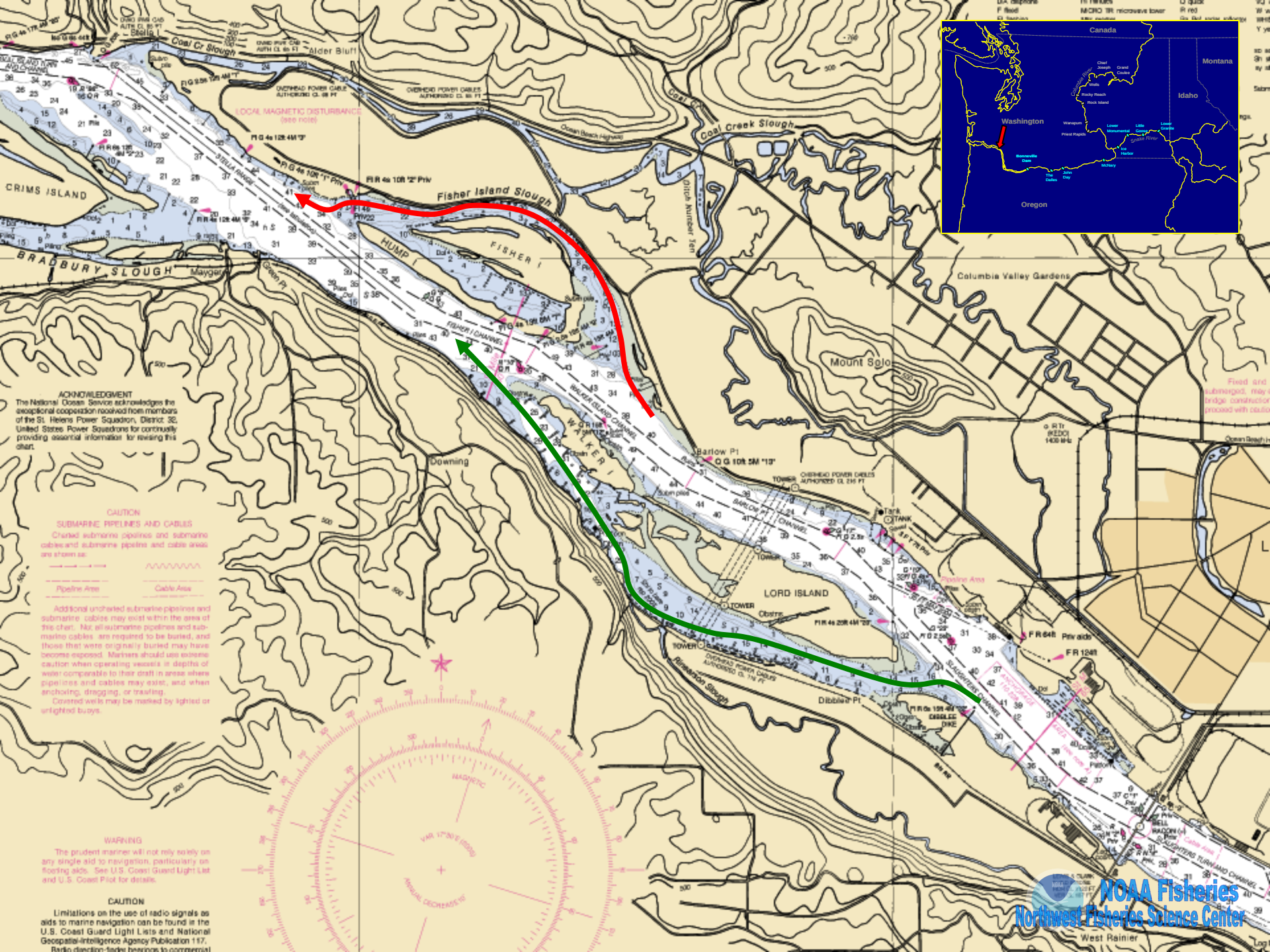
Coal Cr Slough
Alder Bluff
Coal Creek Slough
Fisher Island Slough
CRIMS ISLAND
BRADBURY SLOUGH
HUMP I
FISHER I
Columbia Valley Gardens
Mount Solo
Downing
Barlow Pt
LORD ISLAND
Dibblee Pt
West Rainier
Canada
Montana
Idaho
Washington
Oregon
Chief Joseph
Grand Coulee
Wells
Rocky Reach
Rock Island
Wanapum
Priest Rapids
Lower Monumental
Little Goose
Lower Granite
Ice Harbor
McNary
Bonneville Dam
The Dalles
John Day
Columbia River
Snake River
ACKNOWLEDGMENT
The National Ocean Service acknowledges the exceptional cooperation received from members of the St. Helens Power Squadron, District 32, United States Power Squadrons for continually providing essential information for revising this chart.
CAUTION
SUBMARINE PIPELINES AND CABLES
Charted submarine pipelines and submarine cables and submarine pipeline and cable areas are shown as:
Pipeline Area
Cable Area
Additional uncharted submarine pipelines and submarine cables may exist within the area of this chart. Not all submarine pipelines and submarine cables are required to be buried, and those that were originally buried may have become exposed. Mariners should use extreme caution when operating vessels in depths of water comparable to their draft in areas where pipelines and cables may exist, and when anchoring, dragging, or trawling.
Covered wells may be marked by lighted or unlighted buoys.
WARNING
The prudent mariner will not rely solely on any single aid to navigation, particularly on floating aids. See U.S. Coast Guard Light List and U.S. Coast Pilot for details.
CAUTION
Limitations on the use of radio signals as aids to marine navigation can be found in the U.S. Coast Guard Light Lists and National Geospatial-Intelligence Agency Publication 117.
Radio direction-finder bearings to commercial
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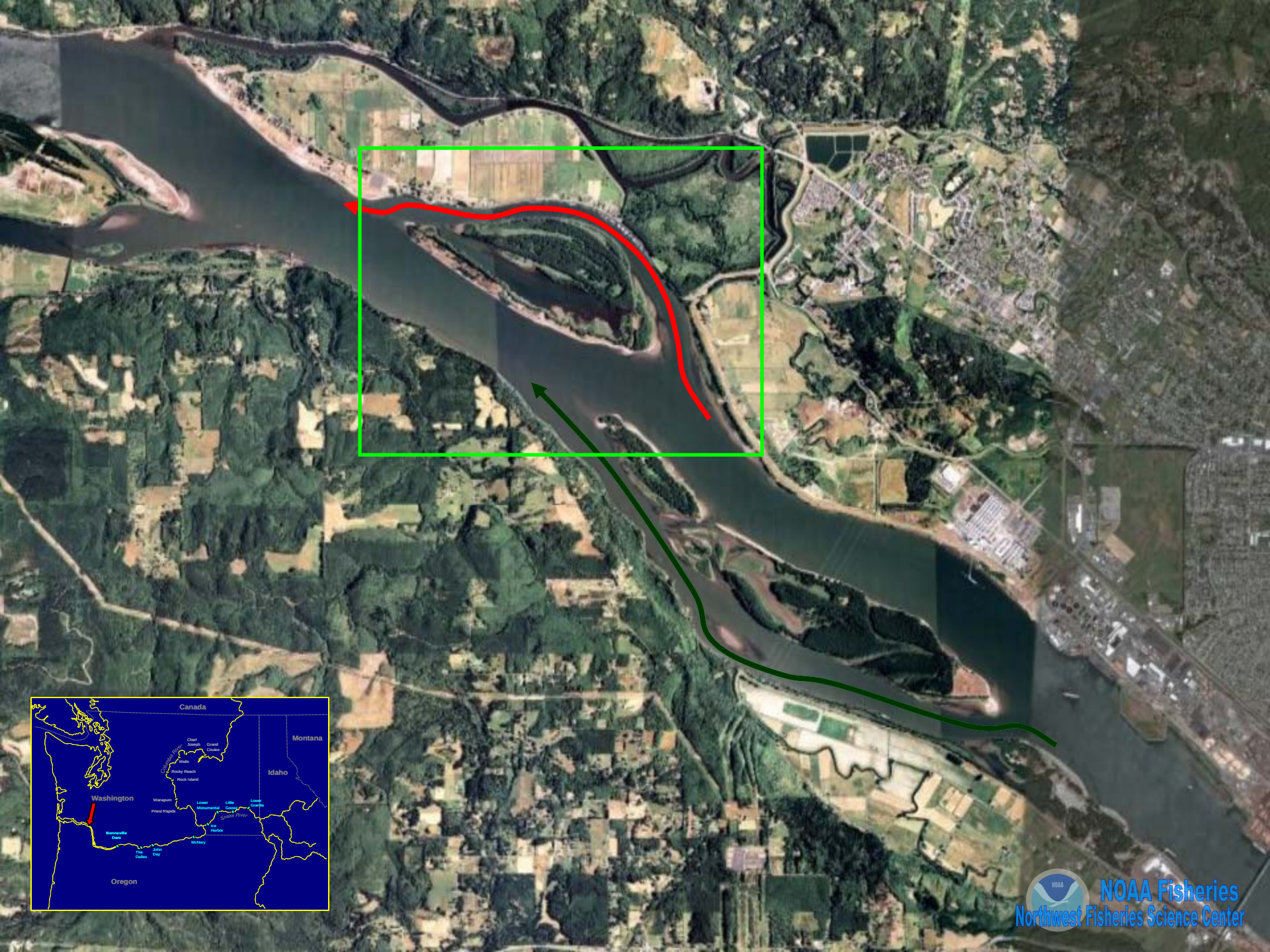
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Rocky Reach
Rock Island
Wanapum
Priest Rapids
Lower Monumental
Little Goose
Lower Granite
Snake River
Ice Harbor
McNary
Bonneville Dam
The Dalles
John Day
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Oregon
Chief Joseph
Grand Coulee
Columbia River
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Rocky Reach
Rock Island
Wanapum
Priest Rapids
Lower Monumental
Little Goose
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Snake River
Ice Harbor
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Bonneville Dam
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Idaho
Washington
Oregon
Columbia River
Snake River
Chief Joseph
Grand Coulee
Wells
Rocky Reach
Rock Island
Wanapum
Priest Rapids
Lower Monumental
Little Goose
Lower Granite
Ice Harbor
McNary
Bonneville Dam
The Dalles
John Day
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0d0c
5B34
335B
46F9
5B37
5693
068D
6F74
5C5A
0B0F
5DC4
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Montana
Idaho
Washington
Oregon
Chief Joseph
Grand Coulee
Wells
Rocky Reach
Rock Island
Columbia River
Wanapum
Priest Rapids
Lower Monumental
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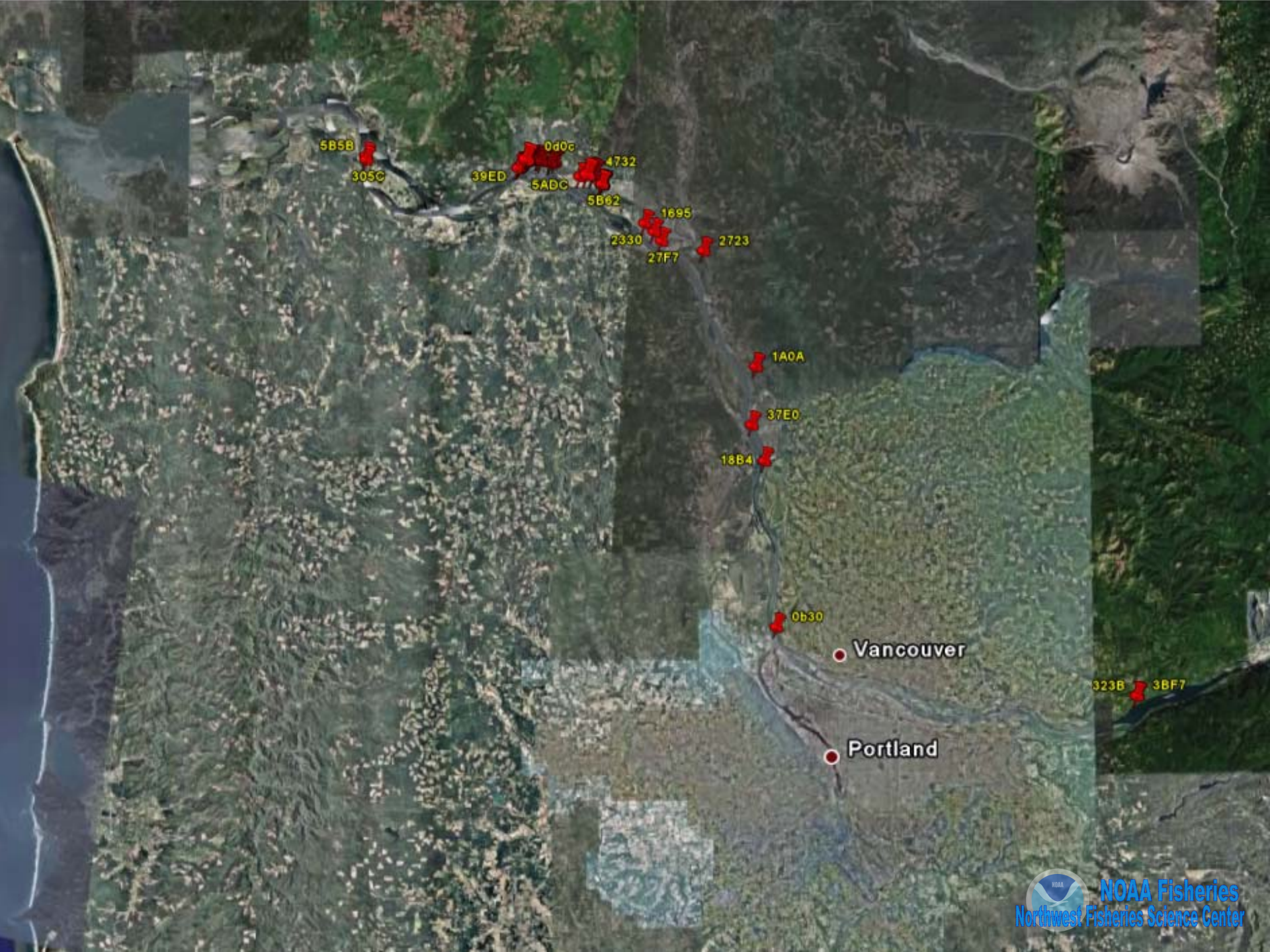
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37E0
18B4
0b30
Vancouver
323B
3BF7
Portland
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Conclusions

Mobile tracking can be an effective tool for evaluation of:

a) migration corridors
- confirms movement along shorelines
- migration through side channels

b) migration behavior
- directed vs non-directed movement

c) specific fate determination
- location and confirmation of stationary tags
- extended residence?

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