# Application of the POST acoustic array to a critical marine conservation problem for juvenile steelhead trout (*Oncorhynchus mykiss*) in British Columbia

POST
PACIFIC OCEAN SHELF TRACKING PROJECT

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# Purpose of POST

- Create an underwater acoustic tracking array in Pacific Northwest continental shelf region
- The vision is large – continental scale (Bering to Baja)
- Collect needed information on not only fish movement but estimates of survival of migrating smolts
- Can be applied to a number of species
- The Ocean Tracking Network is expanding the technology worldwide - POST is the OTN flagship

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http://designformat.com/post/beta/

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OST - Pacific Ocean ... Vancouver Aquarium ... Google Analytics useit.com: Jakob Niel...

POST

PACIFIC OCEAN SHELF TRACKING PROJECT

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PLAY

**See how POST works.**
**The concept, the technology, the scope.**
**Click PLAY.**

## POST

**The Pacific Ocean Shelf Tracking project (POST) is a research tool for tracking the migration and mortality of marine animals along the West Coast of North America, using acoustic transmitters implanted in animals and a series of receivers running in lines across the continental shelf. It is one of fourteen field projects of the Census of Marine Life charting the distribution, diversity and abundance of marine organisms internationally.**

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## NEWS

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ARCHIVE

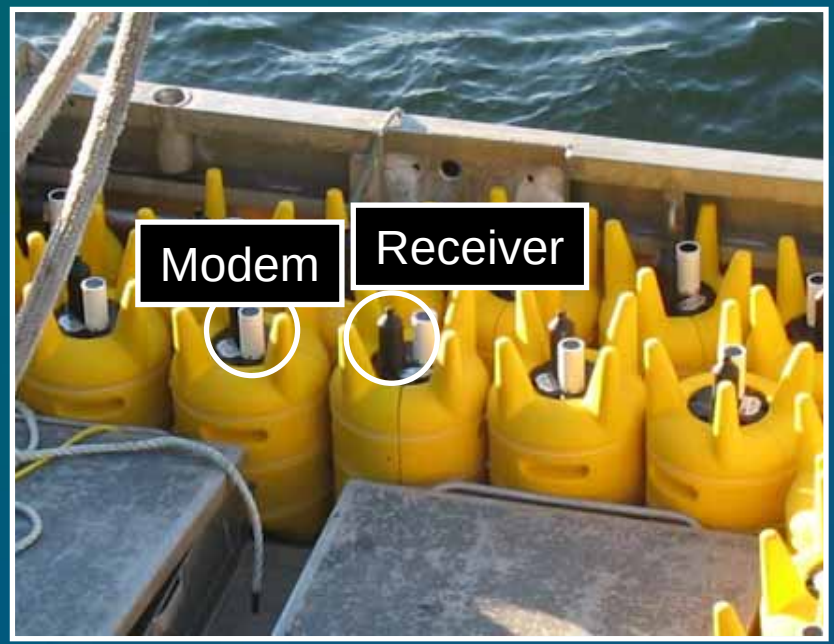
STAFF RESOURCE

CENSUS OF MARINE LIFE MOORE FOUNDATION vancouver aquarium.

# Receivers and tags

# Uploading data remotely

- VEMCO VR3 acoustic receiver with underwater modem
- Communicates with PC controlled surface unit
- 69 kHz



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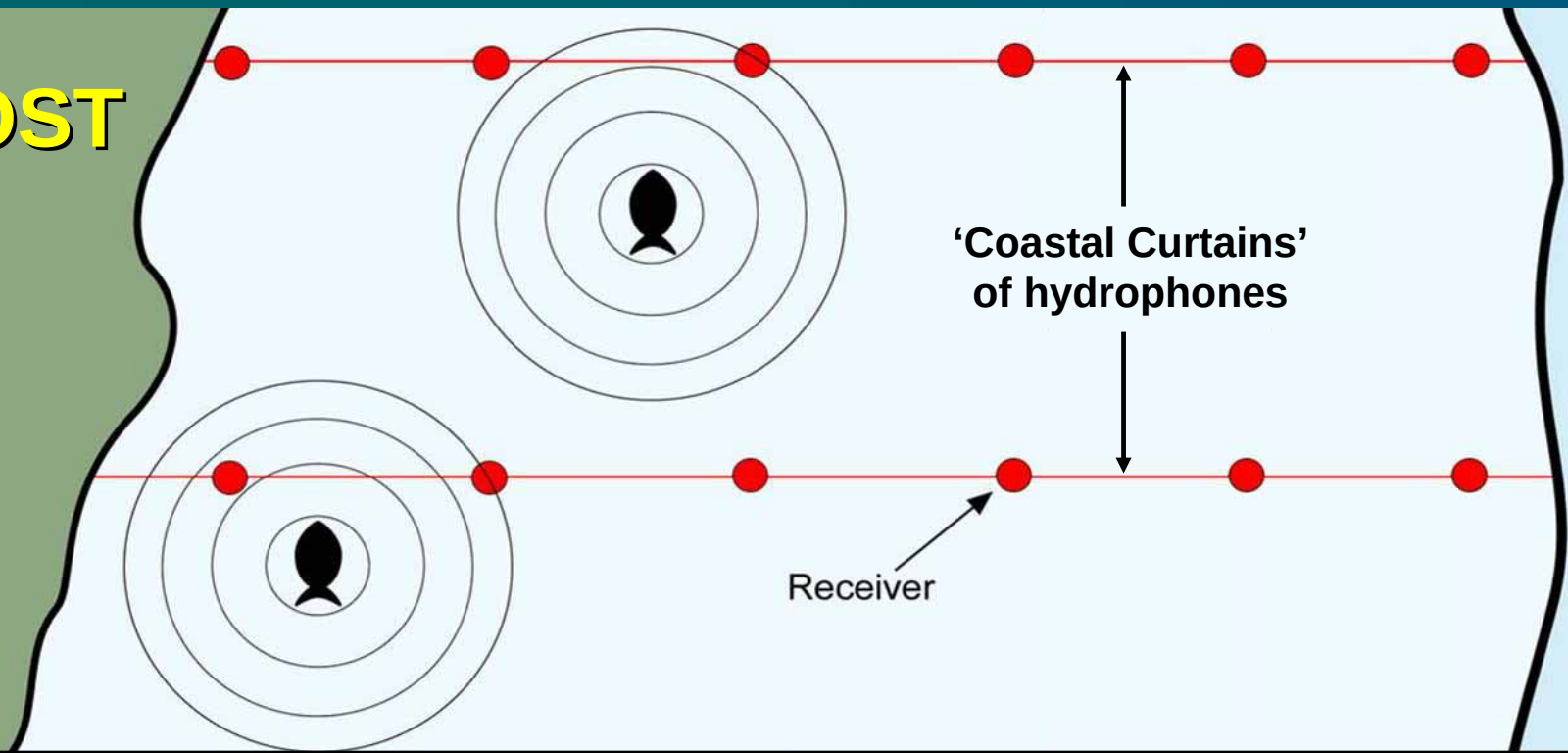
PACIFIC OCEAN SHELF TRACKING PROJECT

**POST**



# The POST array

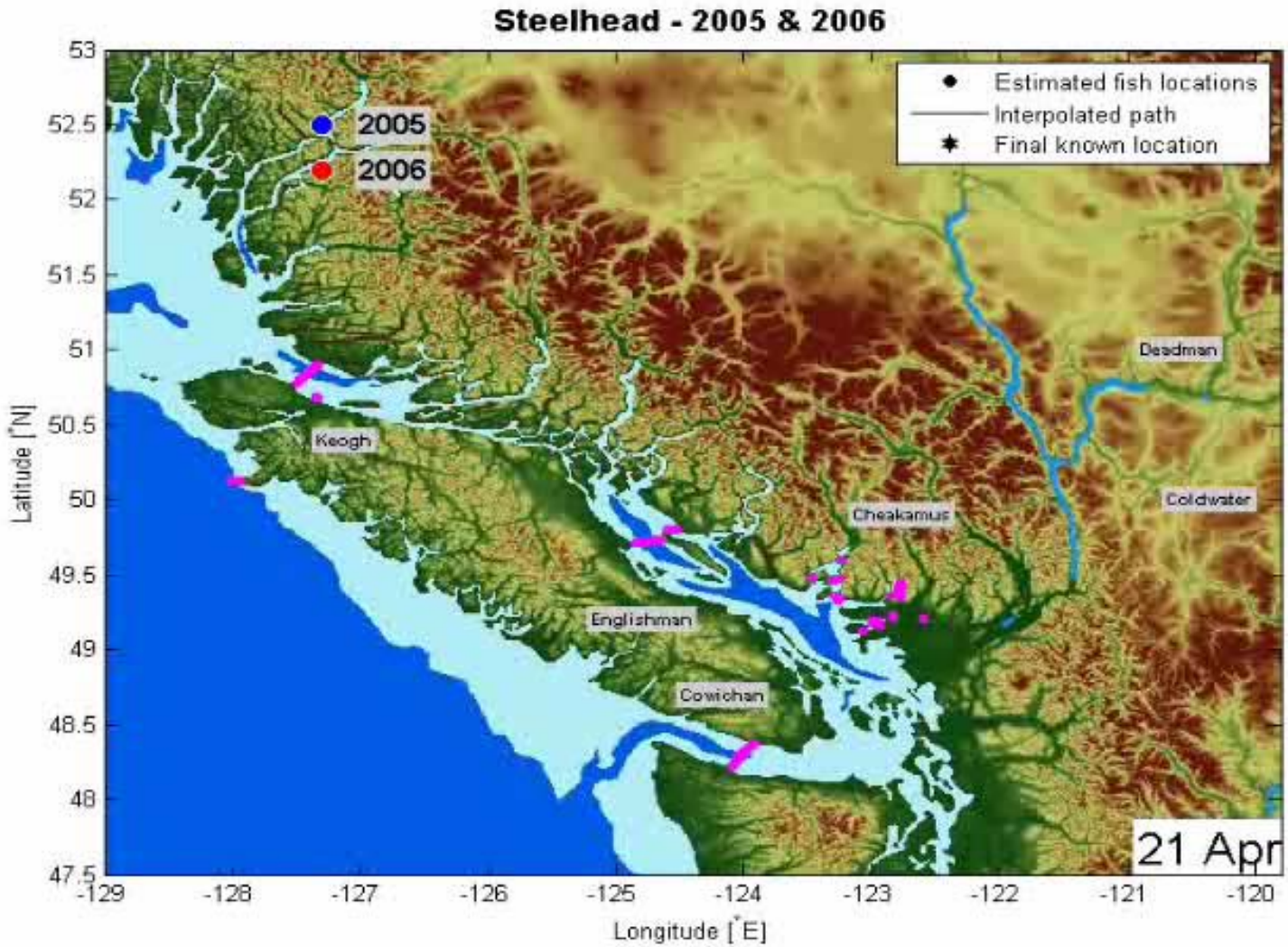
# What POST research can tell us

- a window of observation on salmon behaviour seamlessly between the freshwater and marine environment
- comparative estimates of freshwater vs. marine smolt survival
- ocean mortality is a growing problem facing salmon survival
- accurate calculation of swimming speeds and directional movement of salmon smolts in freshwater and on the shelf
- Expanding the POST array will give us better resolution of marine survival during smolt migration on the shelf

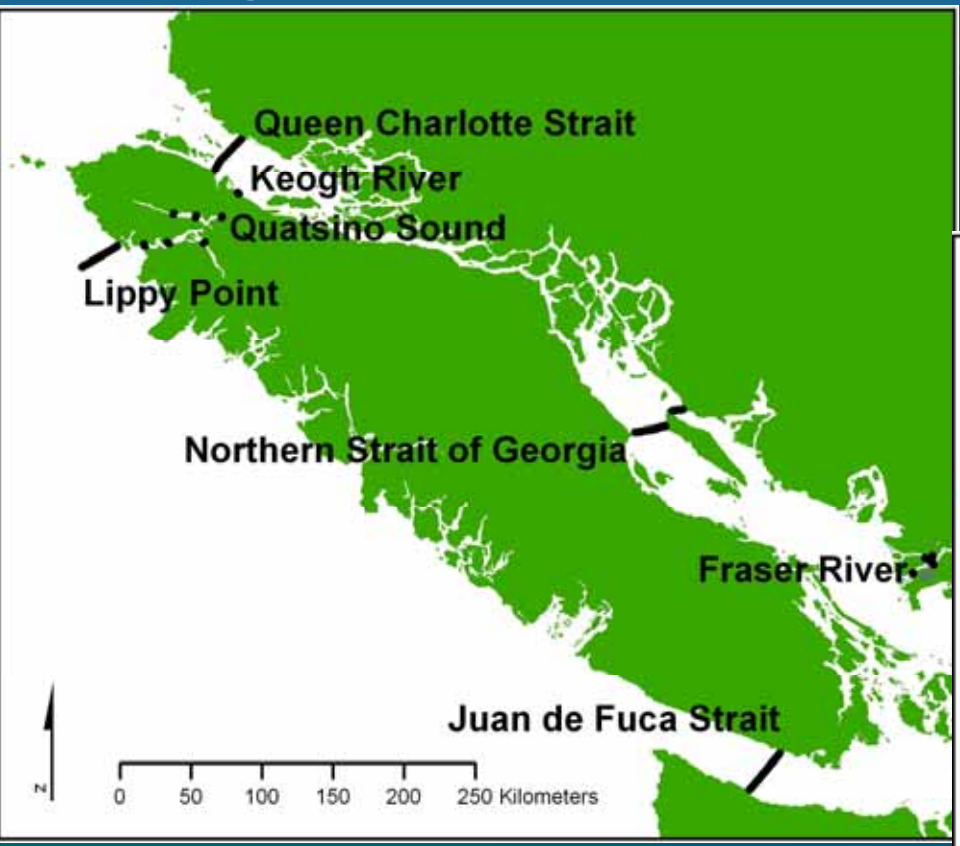
# Ocean survival in southern BC

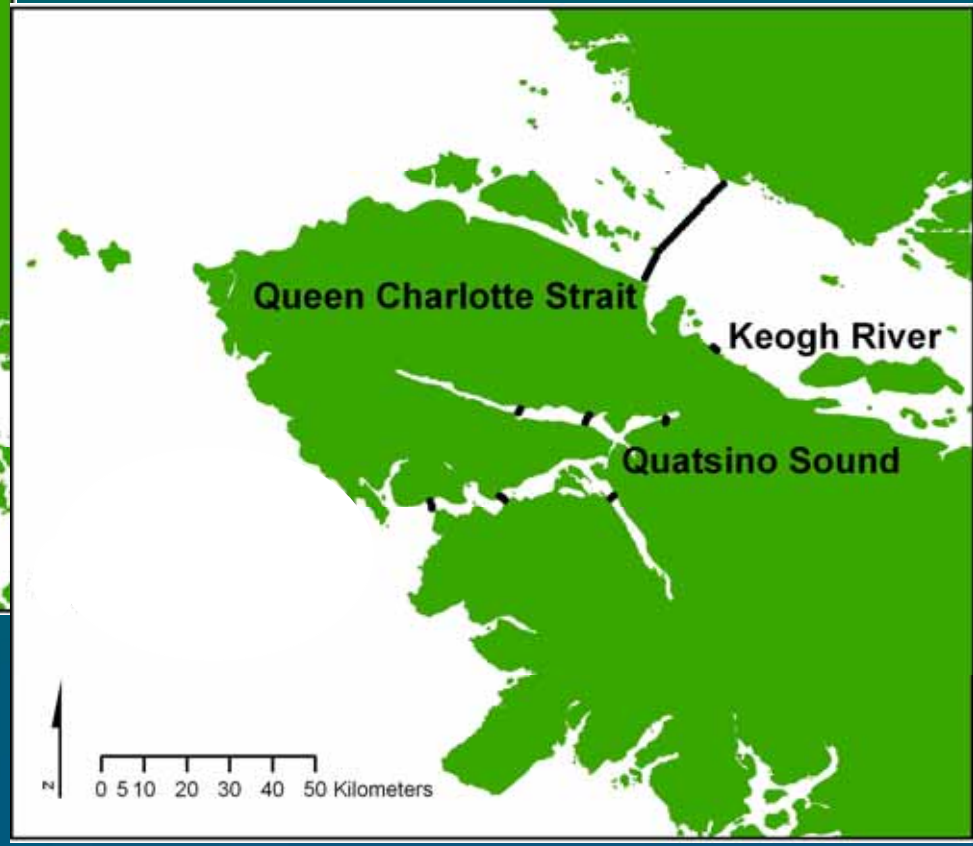
- Salmon survival becoming an important issue
- In southern BC many stocks are facing extinction due to low adult returns
- For steelhead there are dramatic survival differences between E and W coast Vancouver Is.
- Appears to be an ocean survival issue
- POST can help collect critical data on movement and survival to help understand the problem and monitor changes in survival over years.

# POST is collecting data on steelhead stocks movement and migration



# Study sites



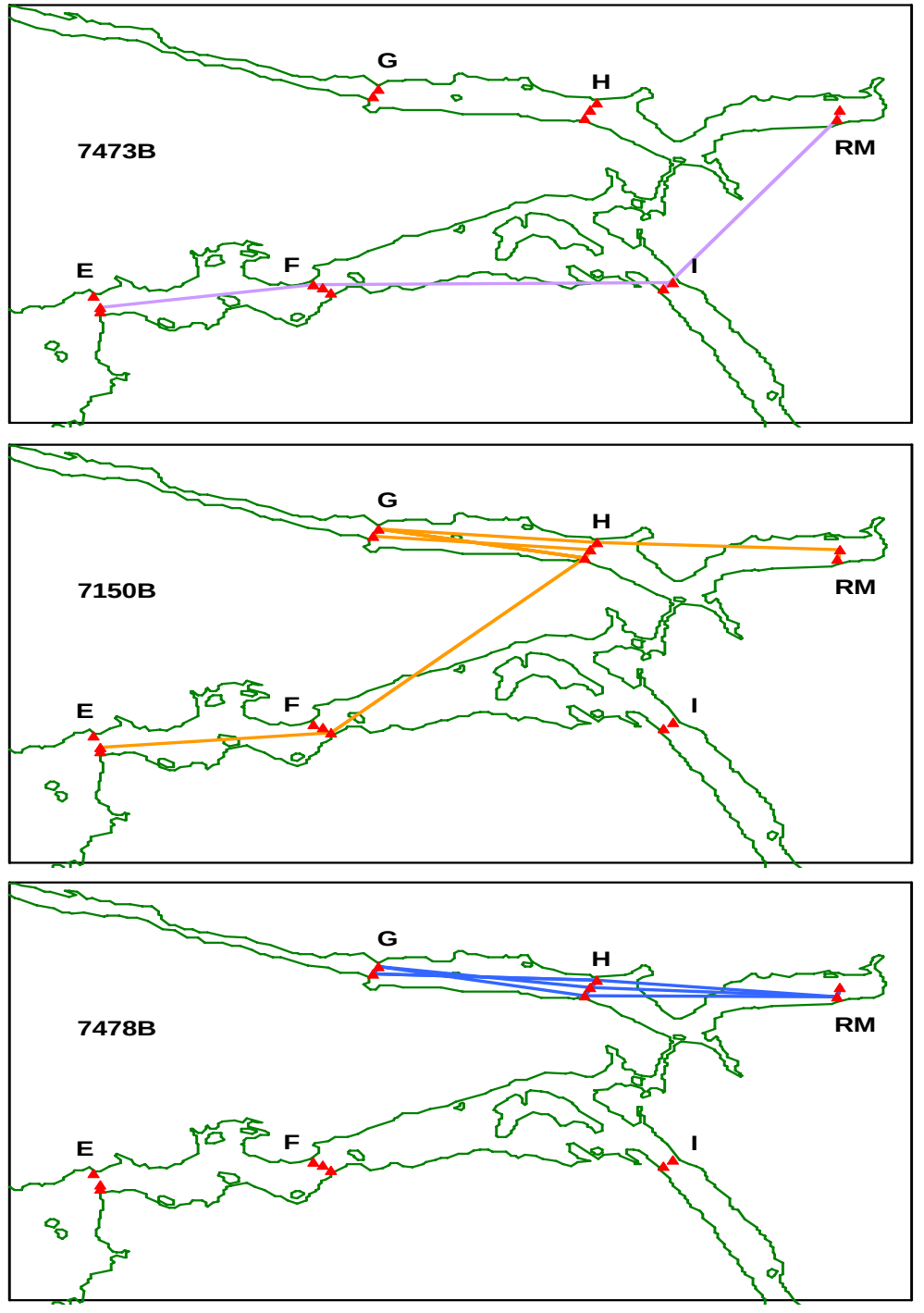

Quatsino Sound 2002, Keogh R 2002, 04, 05, 06

# Behaviour types

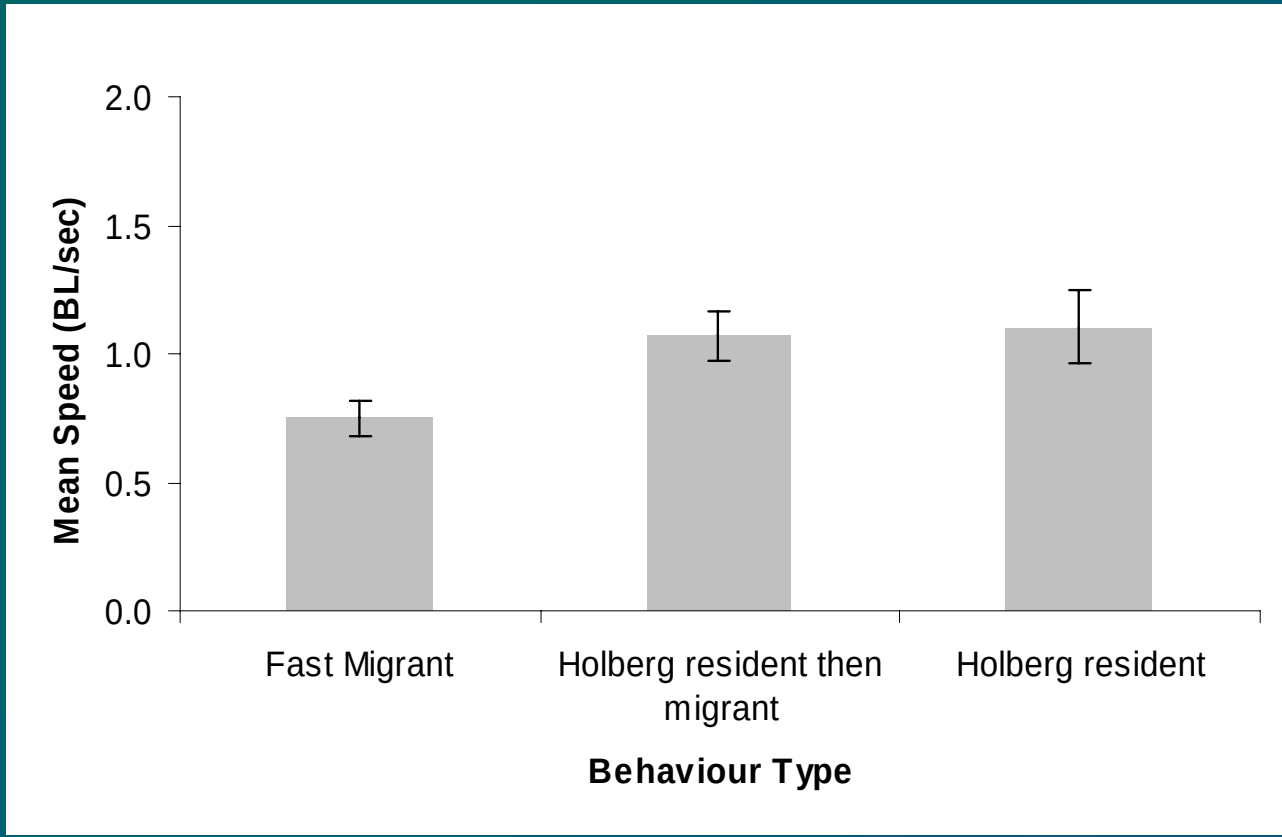
Rapid emigration
N=20

Extensive use of inlet
Prior to emigration
N=7

Long term resident
N=4



# Swimming speeds Quatsino sound

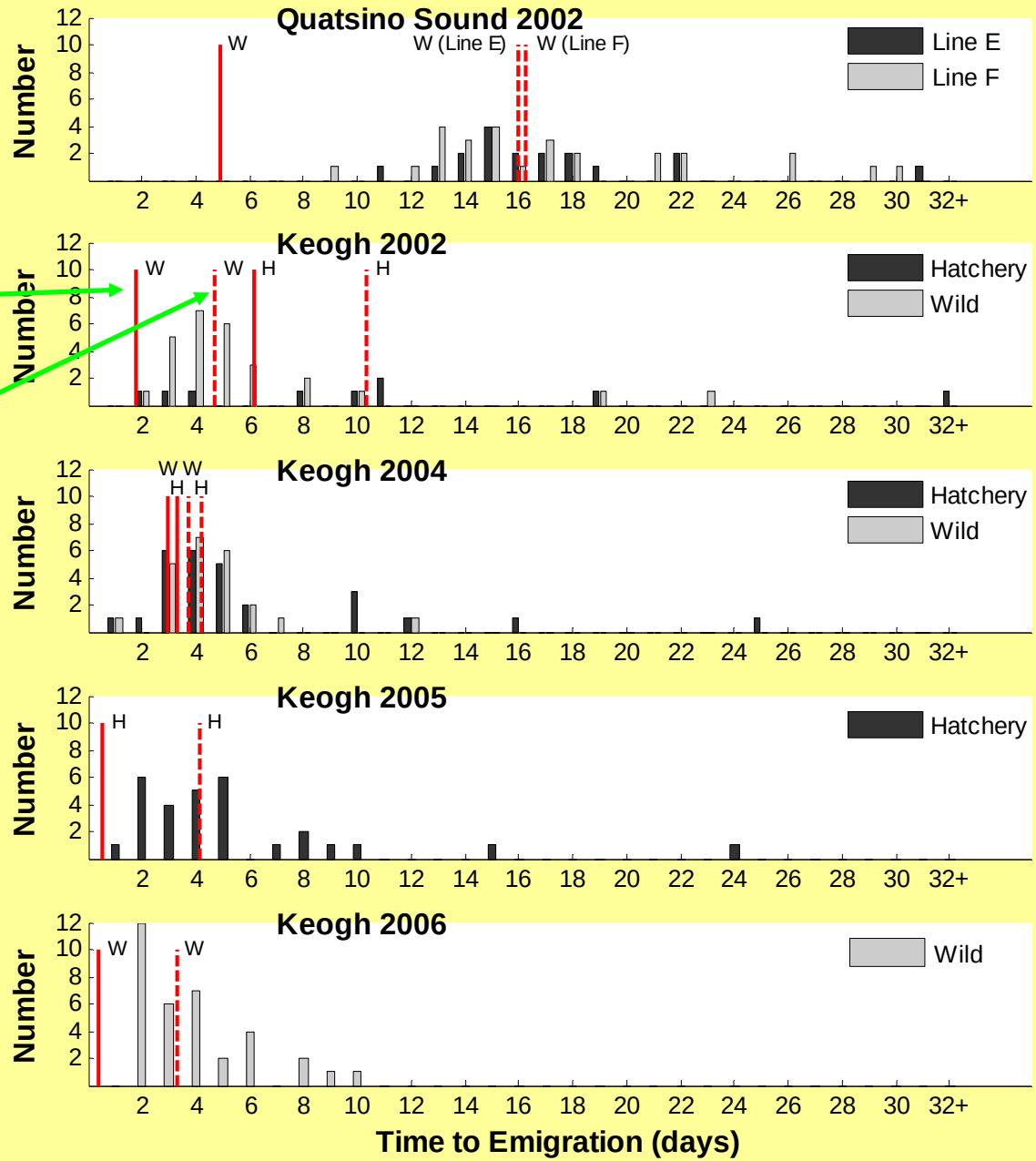



Slowest speed for fish migrating out of the system
Faster speeds for those moving within the system

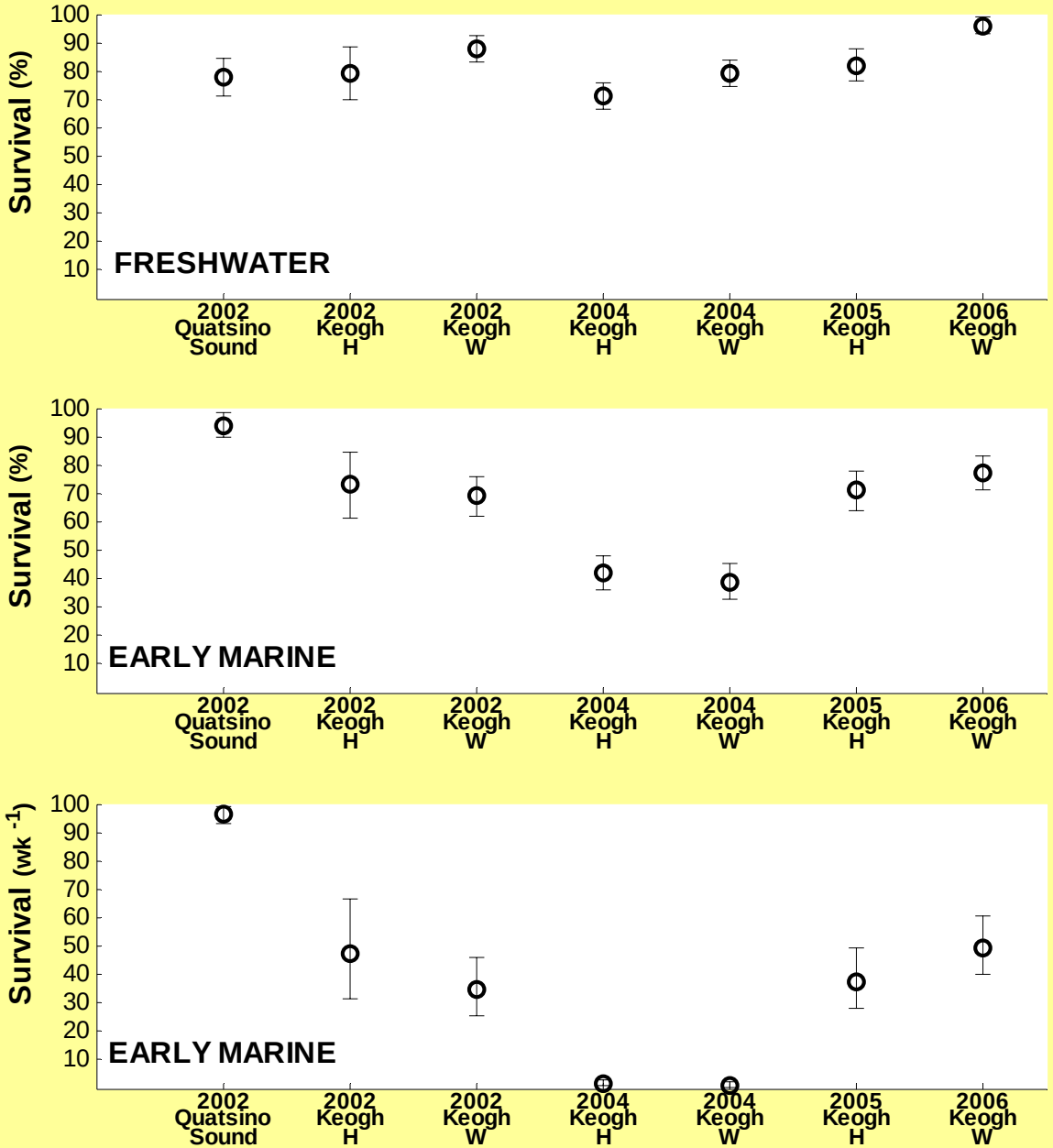
# Freshwater & Marine emigration

Median time release to emigration from fresh water

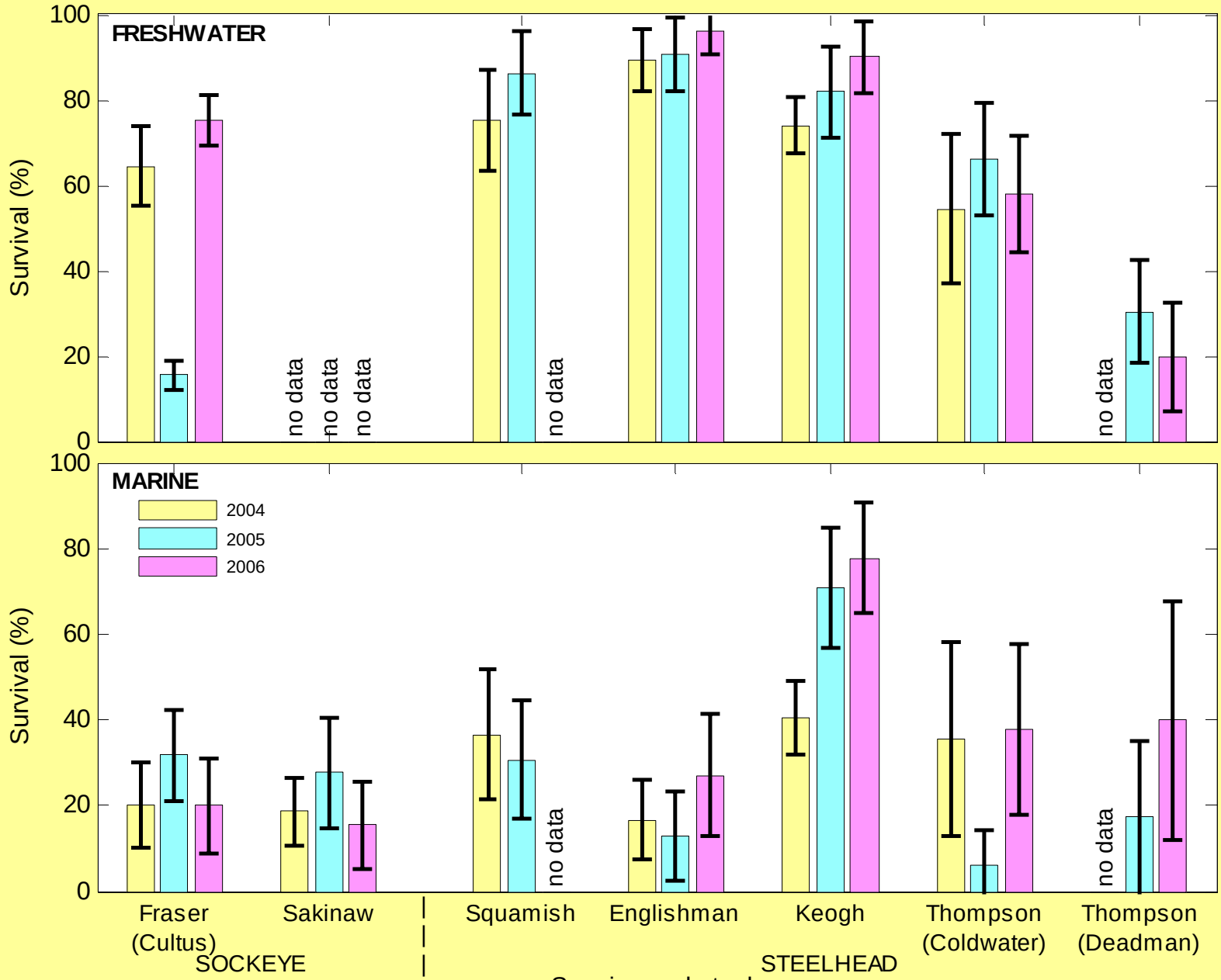
Median time release to last detection on marine listening line



# Freshwater and Marine survival



# Comparable survivals for other stocks



# Concluding points

- We can now monitor steelhead and other species as smolts migrate out of natal streams to the ocean
- We can describe their swimming behaviour, speed and direction
- Freshwater survival of migrating smolts is generally high
- However, survival in marine environment generally low
- Especially marked on the E coast of Vancouver island where adult returns are very low
- POST observations suggest it is a marine survival issue and the fact that it happens quickly suggests a top down process

# OTN

**Will expand and enhance the technology beyond the shelf**

**Blackberries for fish**

**GOOSberries?**

MARINE

# Email, Phone, Data: All in One Fish

## TRACKING MARINE LIFE WITH BLACKBERRY TECHNOLOGY

Photo courtesy of POST

For years we've had cell phones that take pictures and personal digital assistants that surf the Web and play music. If only we could put something like that on a fish to record its worldwide wanderings and send an occasional, fact-filled email. Consider it done. Almost.

The US$136-million Ocean Tracking Network, funded by the Canadian government and housed at Dalhousie University in Nova Scotia, will in effect equip fish with BlackBerry-like mobile devices that can store and send data via an array of sensors on the sea floor. It will even transmit data from one fish to another.

Researchers have been tagging and monitoring fish for decades, but with spotty results. For the most part, the habits and whereabouts of fish in the oceans have remained one of many mysteries of the deep. Much of what we do know about fish is from commercial and sport-catch records—which, ironically, means killing fish to learn they need to be saved.

The Ocean Tracking Network merges the acoustic-sensing technologies of two of the most successful electronic fish-tagging methods: the Pacific Ocean Shelf Tracking Project (POST) and the Tagging of Pacific Pelagics (TOPP).

POST researchers surgically implant acoustic transmitters the size of an almond into Pacific Northwest salmon smolts and California sturgeon. As the fish migrate through the oceans, the transmitters send out acoustic signals that are picked up by sensors strung in a trapline across the continental shelf. Sensors detect fish as they pass between Oregon and the north end of the Alaska panhandle. The tags' unique code identifies each individual fish and its location. "It's like an acoustic bar code," says Ron O'Dor, a Dalhousie professor and senior scientist for the Census of Marine Life, the network's principal researcher.

TOPP uses tags similar to computer memory sticks, collecting data from fish and marine mammals as they move and recording data such as depth, temperature, salinity, light, and location. The data are then beamed to an ARGOS satellite—either when the animal surfaces, the tag pops off, or the animal is captured and the tag recovered. More than 2,500 animals and nearly two dozen species have been tagged in the eastern Pacific Ocean. Researchers receive reports from hundreds of animals daily, says Barbara Block,