Monitoring restoration success: Assessing Marine-Freshwater Food Web Linkages Using Stable Isotopes

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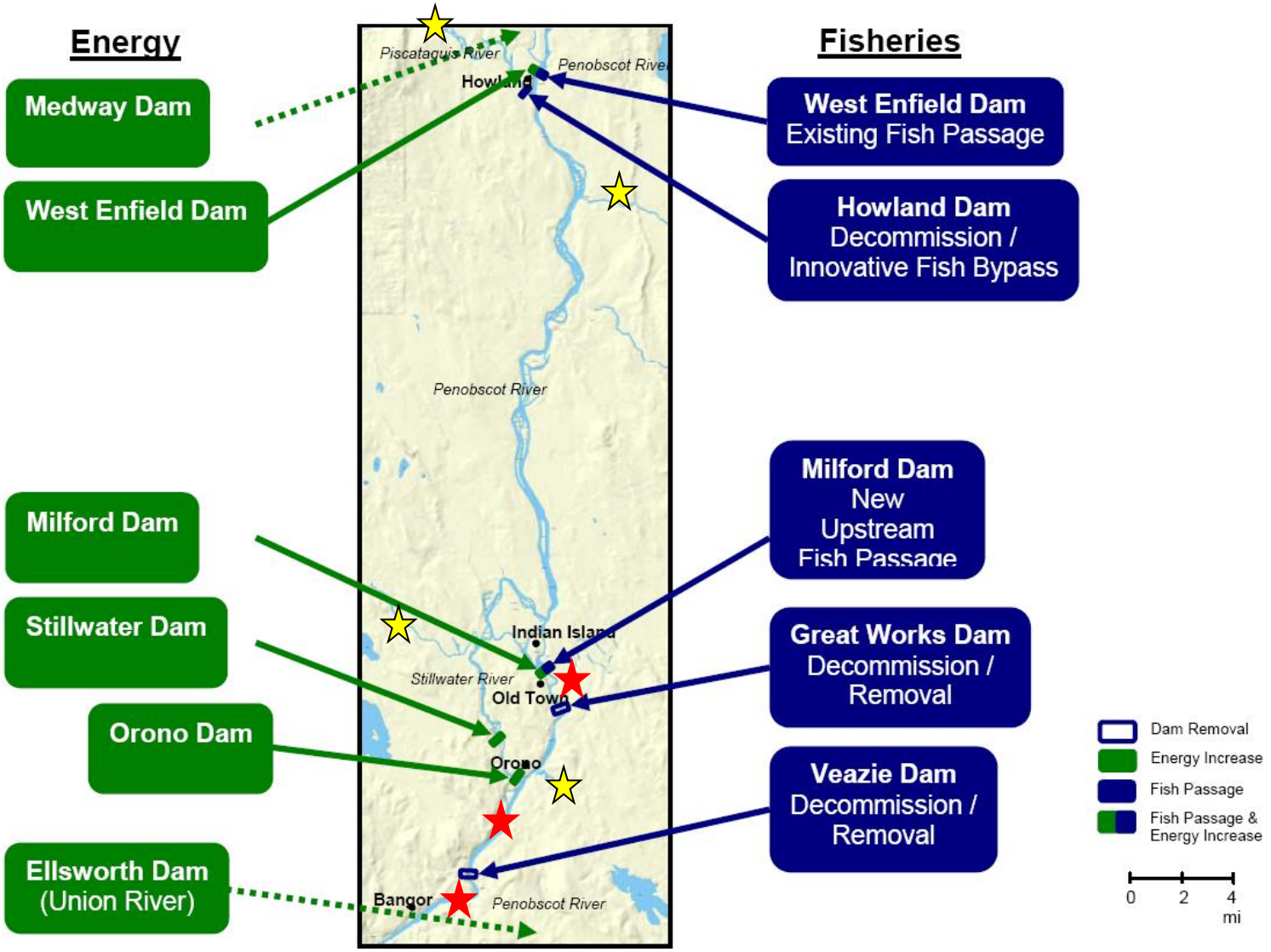
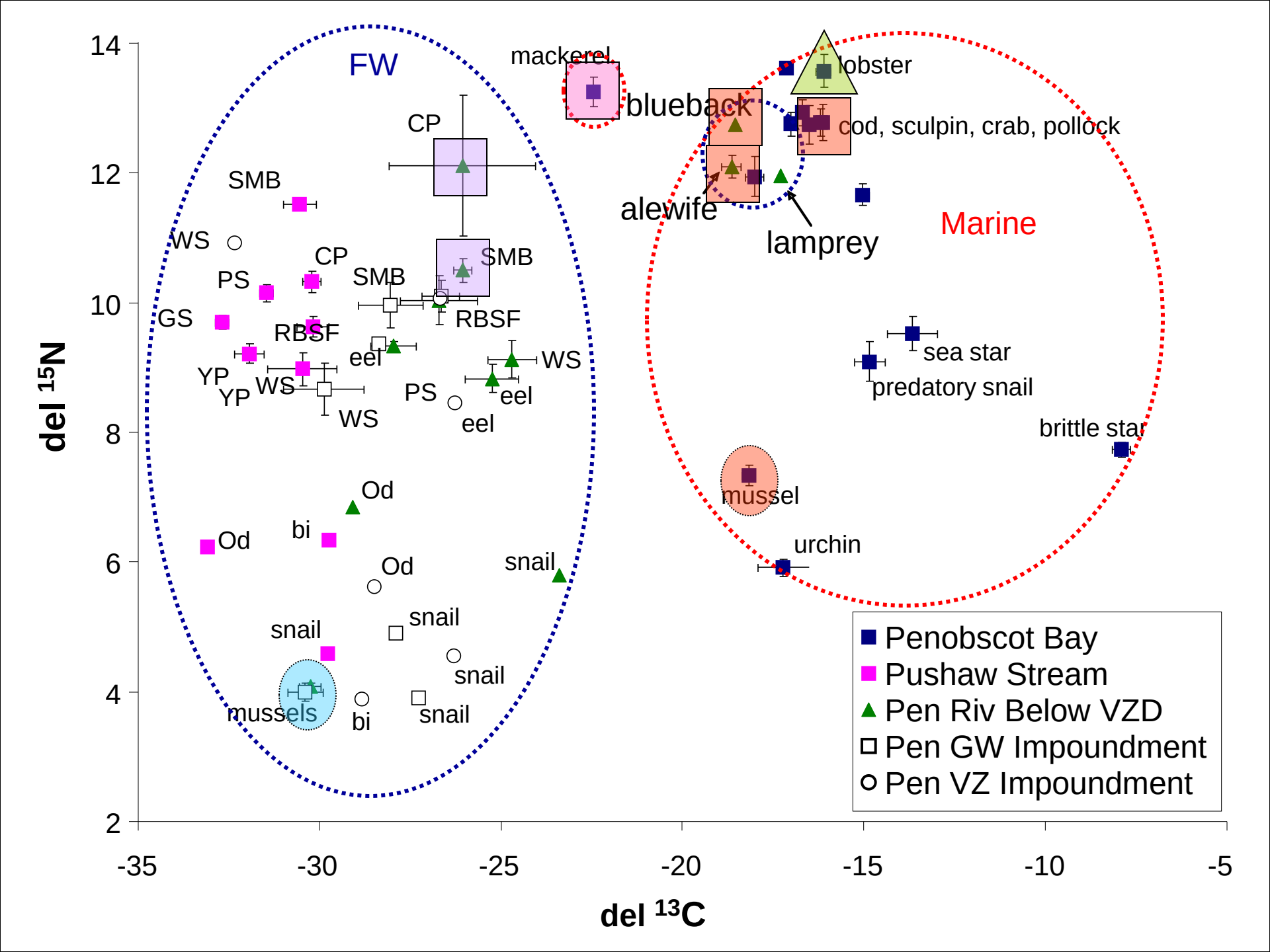
With increases in diadromous fish, particularly alewife, it is expected that:

- Spawning alewife will add marine-derived nutrients through spawning, excretion & mortality, shifting freshwater ^{15}N signatures higher and enriching freshwater ^{13}C towards heavier (marine) values.
- YOY alewife may become important forage for larger freshwater predators, increasing trophic position of some species.
- Nearshore marine predators may consume out-migrating YOY alewife in greater numbers, shifting marine ^{13}C signatures towards lighter (freshwater) values.

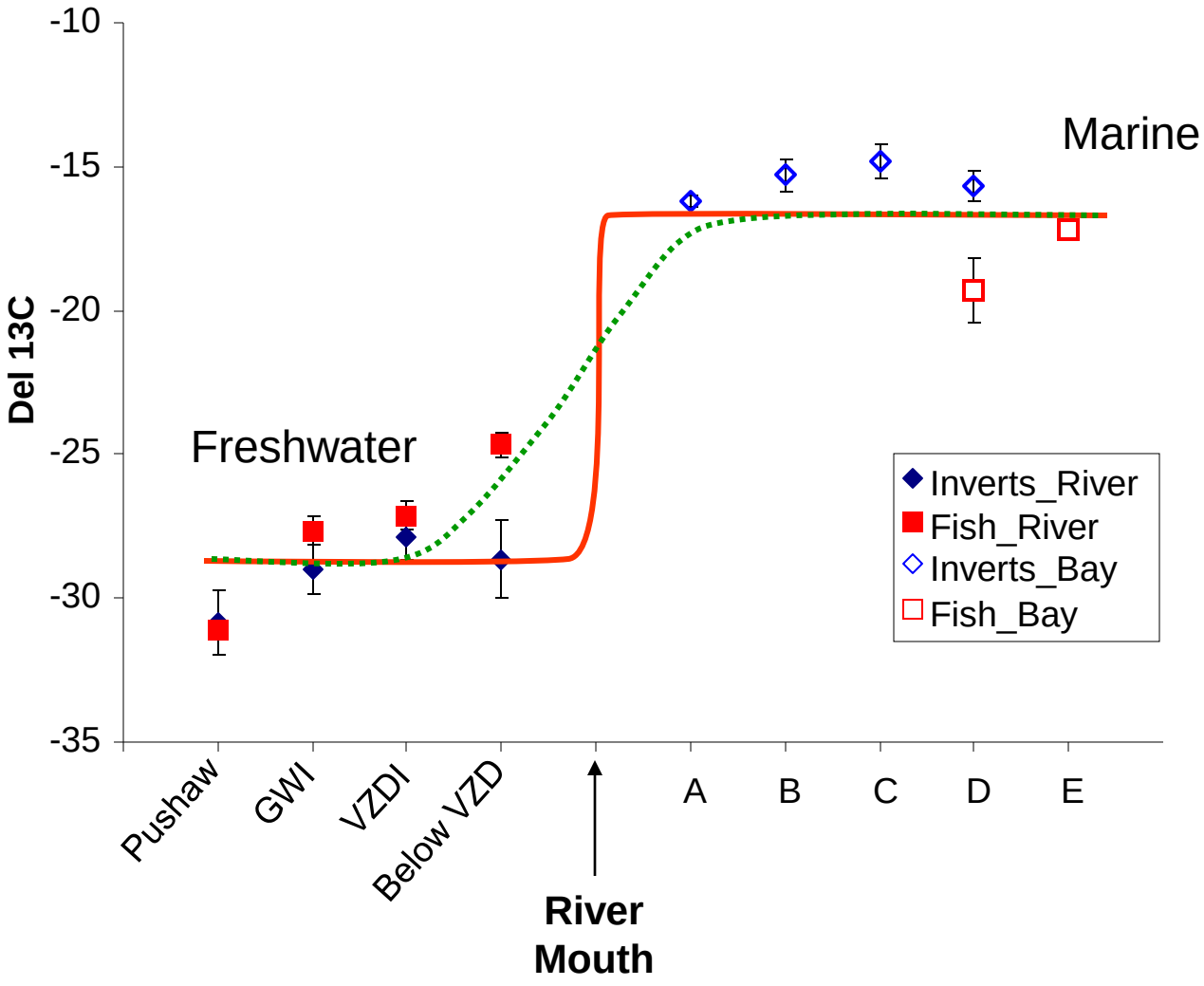
Freshwater sites: Penobscot River and Tributaries



Marine sites: Penobscot Bay


FW
Marine
mackerel
bluebacks
lobster
cod, sculpin, crab, pollock
alewife
lamprey
sea star
predatory snail
brittle star
mussel
urchin
CP
SMB
WS
PS
GS
RBSF
YP
eel
Od
bi
snail
mussels
Penobscot Bay
Pushaw Stream
Pen Riv Below VZD
Pen GW Impoundment
Pen VZ Impoundment
del 15N
del 13C
14
12
10
8
6
4
2
-35
-30
-25
-20
-15
-10
-5

Connectivity



What's next?

- Analyze new samples (more fish and inverts from Pen bay and additional tributaries)
- Comparison to Kennebec River system (2010)
- Resampling post dam removal

DSRRN: Diadromous Species Restoration Research Network

- Recent workshop April 1-2, 2010 **Resilience of North Atlantic Diadromous Fish Assemblages: a Restoration Perspective**
- Upcoming workshop (late May 2011): **Natural variability in diadromous fish populations and abiotic/biotic system**
- Workshop #3: **Science and management** (January 2012)
- **Final Science Symposium** (Summer or Fall 2012)

DSRRN

DSRRN

- Website updates: http://www.umaine.edu/searunfish/