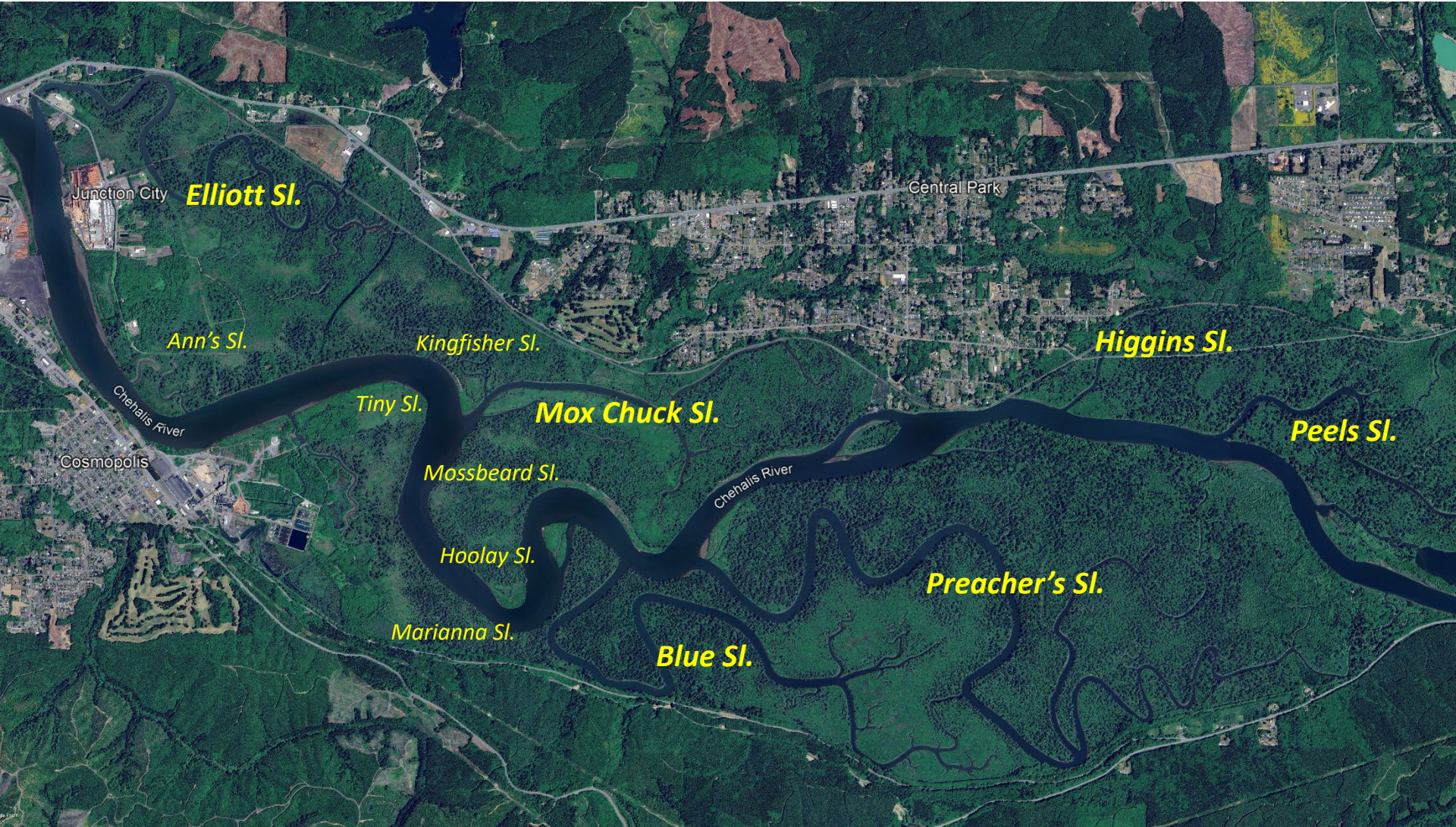
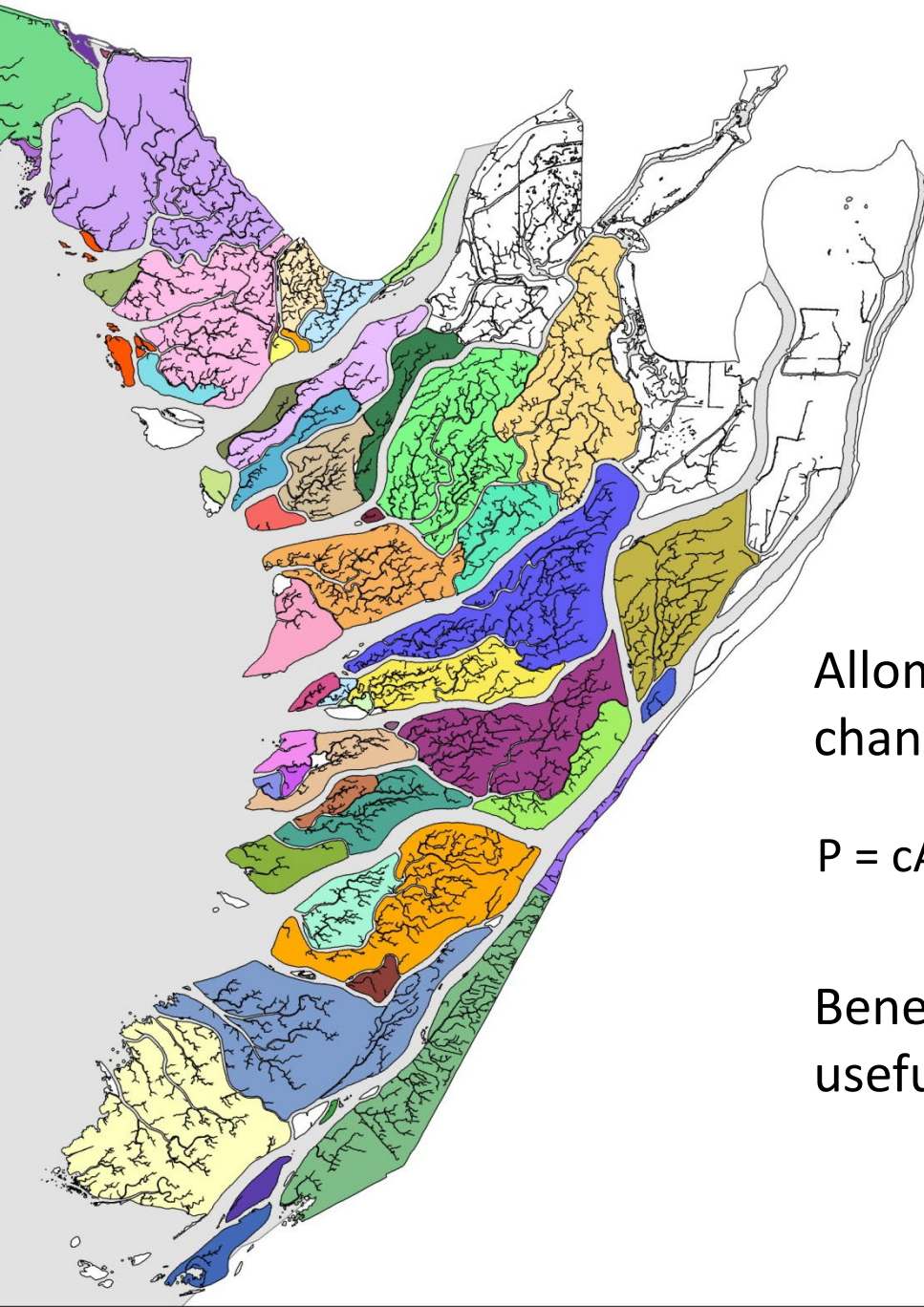


Old Friends

W. Gregory Hood
Skagit River System Cooperative





Prediction is necessary:

for planning and design
to evaluate outcomes (monitoring)
to better understand our system

Qualitative vs. Quantitative predictions

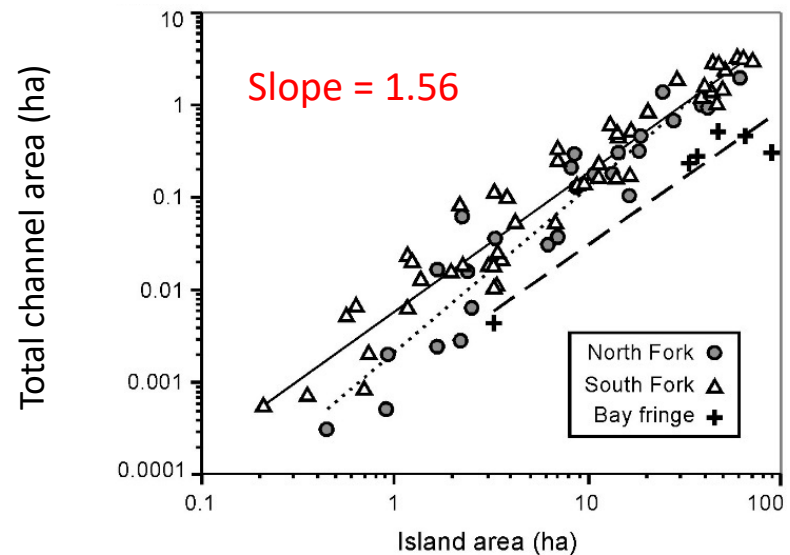
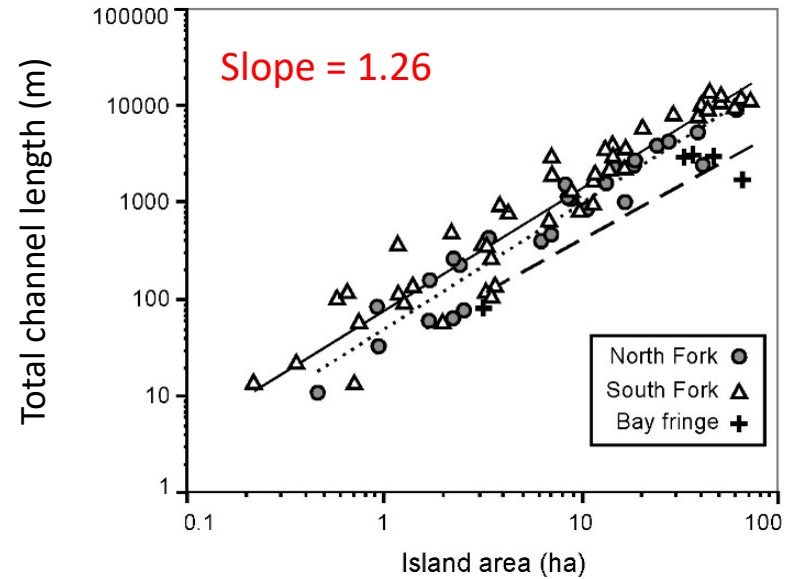
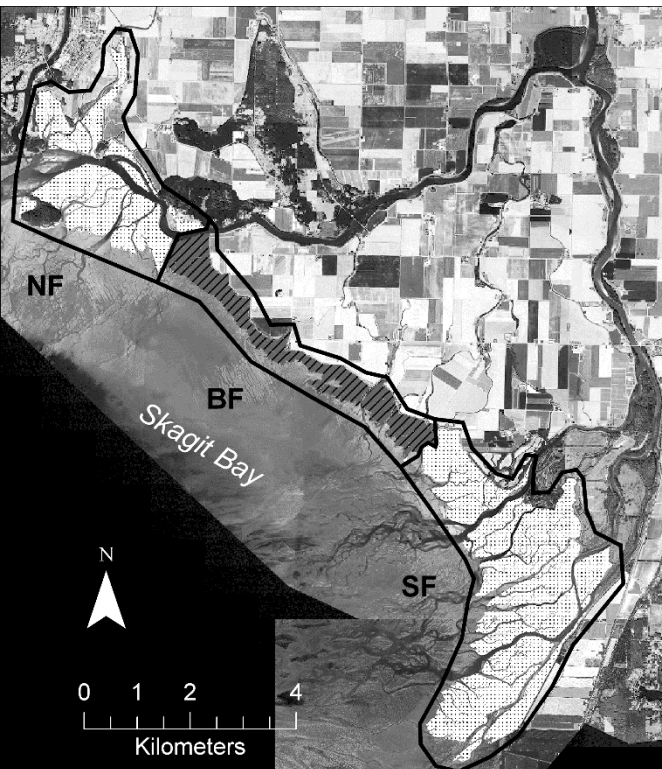
Allometry of marsh islands and
channel geometry.

$$P = cA^b \rightarrow \log(P) = \log(c) + b \log(A)$$

Benefit: Prediction of a suite of
useful channel geometries.

Application: [1] Diagnosis, [2] Planning

Hood WG. 2007. Scaling tidal channel geometry with marsh island area: a tool for habitat restoration, linked to channel formation process. *Water Resources Research* 43, W03409, doi:10.1029/2006WR005083



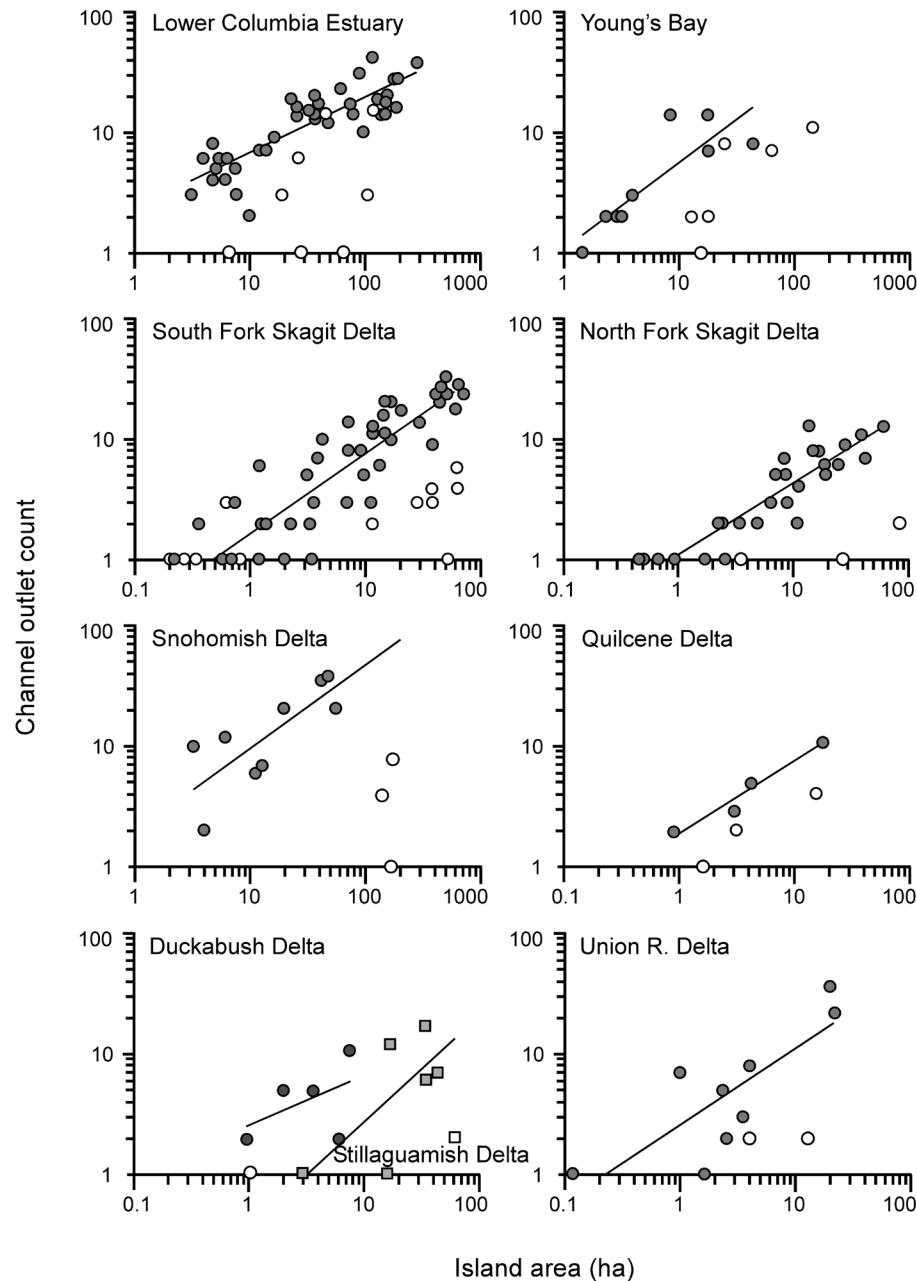
Non-additive cumulative effects

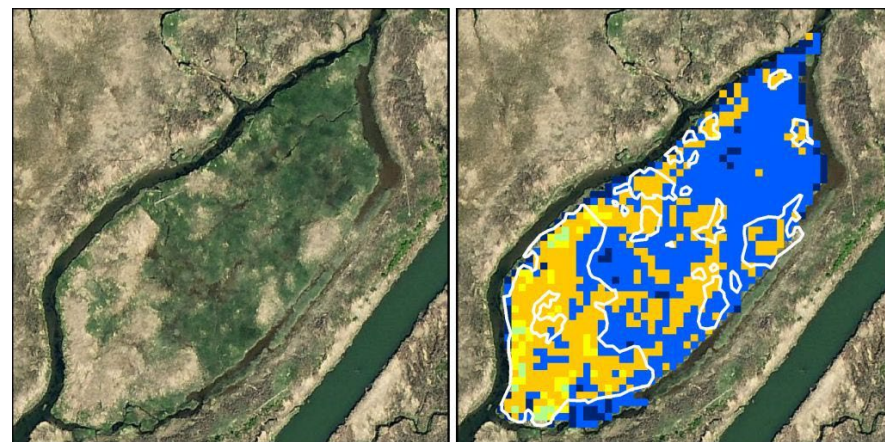
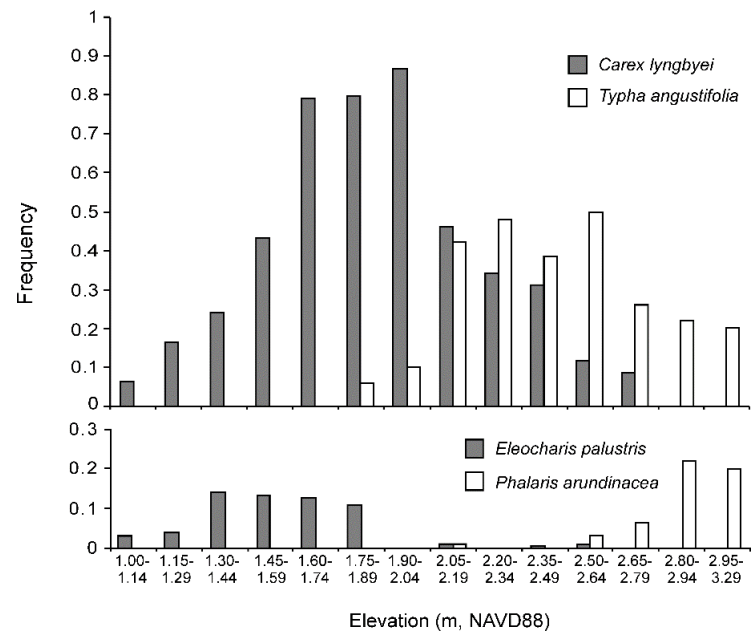
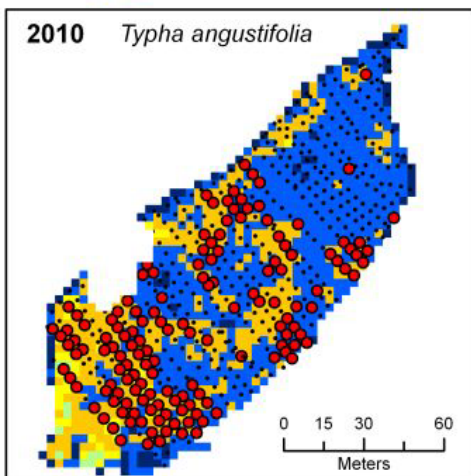
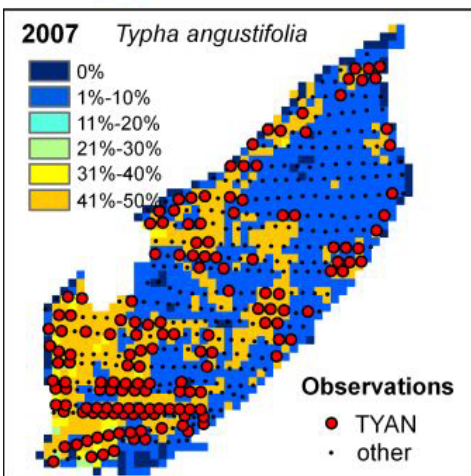
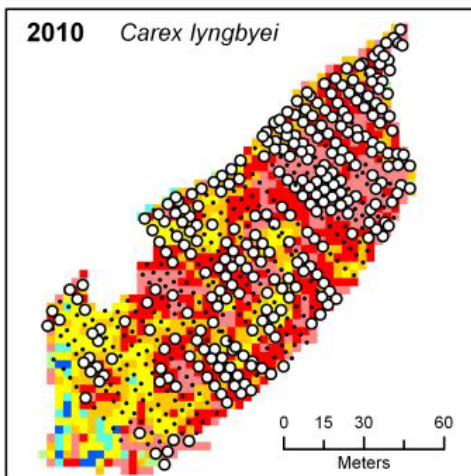
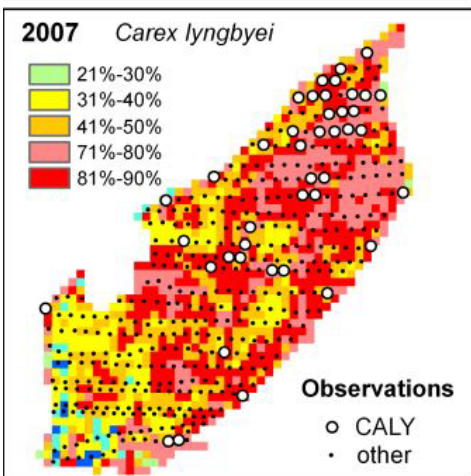
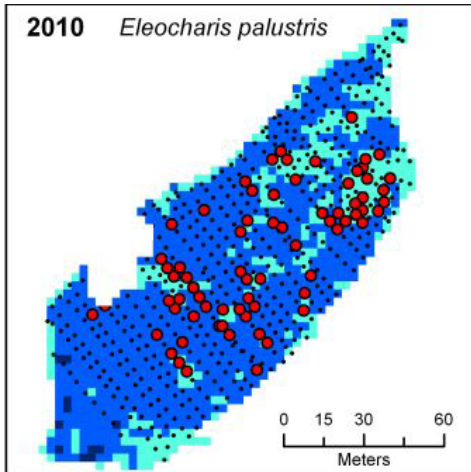
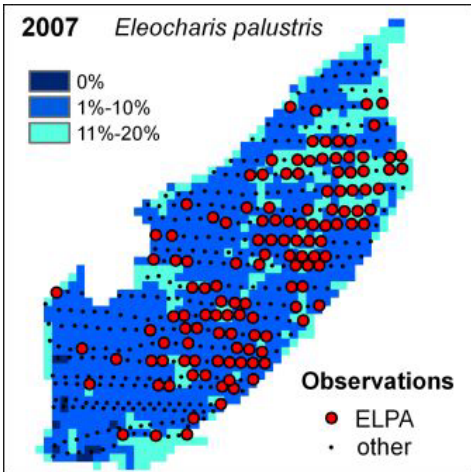
Application: [3] Restoration Design, [4] Monitoring/evaluation

How many tidal channels,
how many dike breaches?

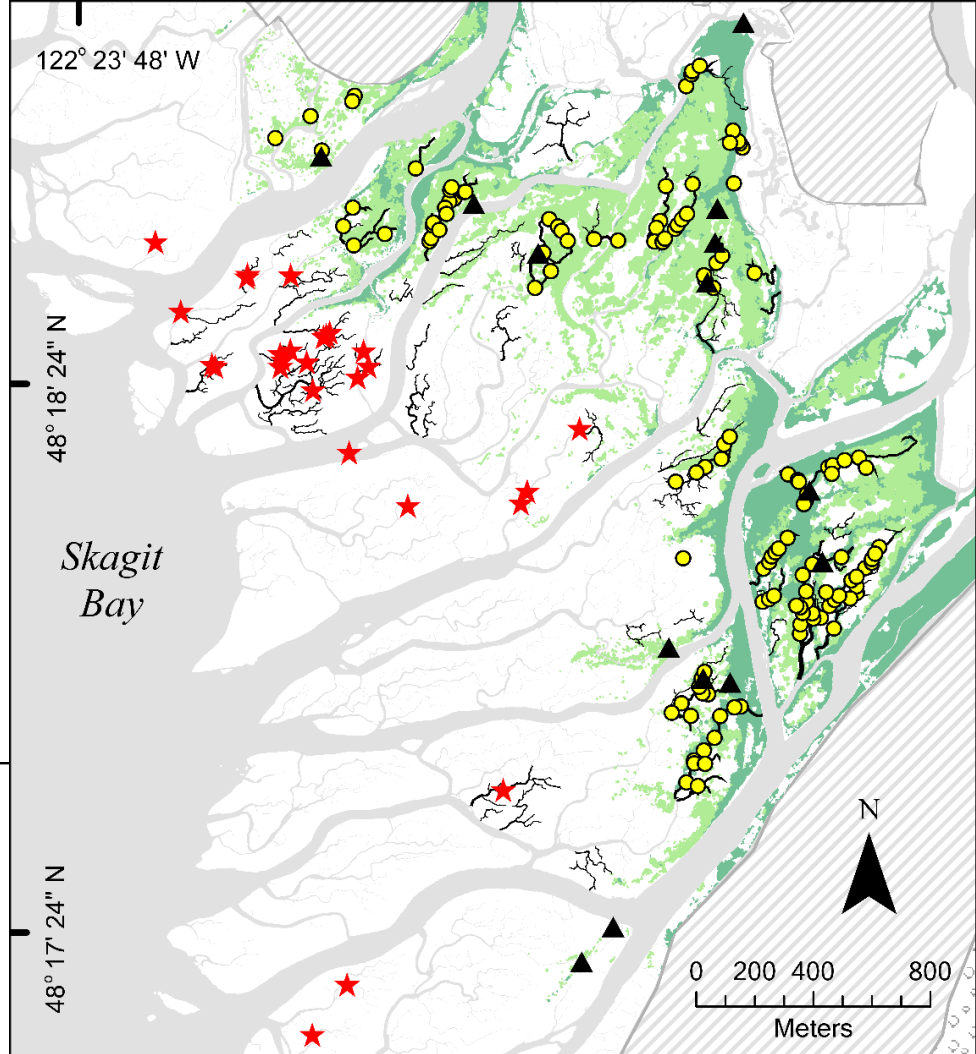
We are underestimating
the number of dike
breaches necessary to
mimic reference marsh
systems by 5-fold. This
likely affects fish access to
tidal channel networks.

Hood WG. 2015. Predicting
the number, orientation, and
spacing of dike breaches for
tidal marsh restoration.
Ecological Engineering
83:319-327





Hood WG. 2013. Applying and testing a predictive vegetation model to management of the invasive cattail, *Typha angustifolia*, in an oligohaline tidal marsh reveals priority effects caused by non-stationarity. *Wetlands Ecology and Management* 21:229-242



Upstream river management
(e.g., bank armoring, riparian
or floodplain deforestation)

↓
Large woody debris
recruitment & transport

↓
Tidal shrub vegetation
(recruitment on nurse logs)

→ Beaver &
their dams

3x
→ Low-tide
pools

3x
→ Fish
(salmon)

↙ ↘
Predation refuge,
detritus trapping
and prey production

Hood WG. 2012. Beaver in tidal marshes:
Dam effects on low-tide channel pools
and fish use of estuarine habitat. *Wetlands*
32:401–410



beaver dam
beaver dam
beaver dam
beaver dam

beaver dam
beaver dam
beaver dam
beaver dam
beaver dam
beaver dam
beaver dam

beaver dam
beaver dam
beaver dam
beaver dam
beaver dam

beaver dam
beaver dam
beaver dams??