



# Aquatic Barrier Removal at the Head-of-Tide

Presenter: Michael Chelminski

We support the



UNITED NATIONS DECADE ON  
ECOSYSTEM  
RESTORATION  
2021-2030



# Meet the Presenter



**Michael Chelminski**

August 22 / Session L

Aquatic Barrier Removal  
at the Head-of-Tide



# Agenda

1. Inclusion & Diversity & Inspiration
2. Ecological Restoration at the Head-of-Tide (HoT)
3. Tides and Tidal Data Collection
4. HoT Barrier Characteristics
5. HoT Barrier Opportunities & Constraints
6. Coastal Resiliency & Flood Hazards
7. A HoT Aquatic Barrier Story



# Inclusion & Diversity Moment

& Inspiration...

UNITED STATES DEPARTMENT OF THE INTERIOR, J. A. Krug, *Secretary*  
FISH AND WILDLIFE SERVICE, Albert M. Day, *Director* ☯ ☯ ☯

## PARKER RIVER A NATIONAL WILDLIFE REFUGE

*By Rachel L. Carson*

*Drawings and photographs by Katherine L. Howe*



*Conservation in Action*

NUMBER TWO

UNITED STATES GOVERNMENT PRINTING OFFICE • WASHINGTON : 1947  
FOR SALE BY THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C. • PRICE 15 CENTS

PERFOWL REFUGES OF  
ANTIC FLYWAY



PARKER RIVER  
Wildlife Refuge

Department of the Interior, Washington, D. C.

We support the



ECOSYSTEM  
RESTORATION

# Ecological Restoration at the Head-of-Tide

## Opportunities at the Head-of-Tide (HoT)

- Aquatic Habitat Connectivity
- Reconnection of riverine and tidally influence estuarine & marine habitats
- **Barrier Types**
  - Dams
  - Culverts



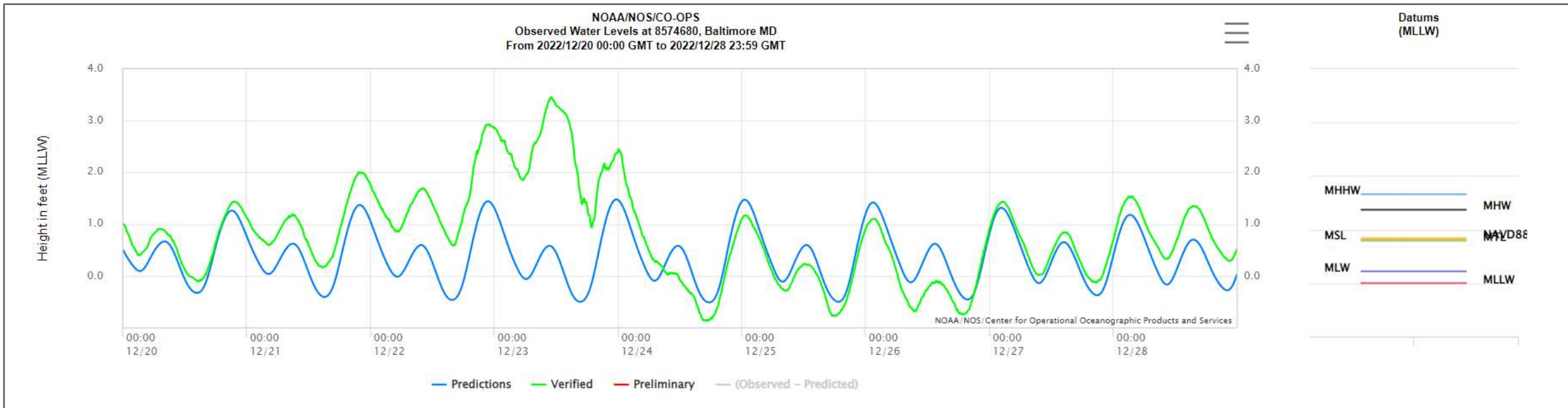


# Drivers for HoT Barrier Removal

- Increase access to habitat and therefore populations
- Landward migration of habitats
- Accommodate Sea Level Rise
- Infrastructure Resiliency

*Drone imager by Markley Boyer on behalf of the Maine Coast Heritage Trust*





## What are these “tide” things?

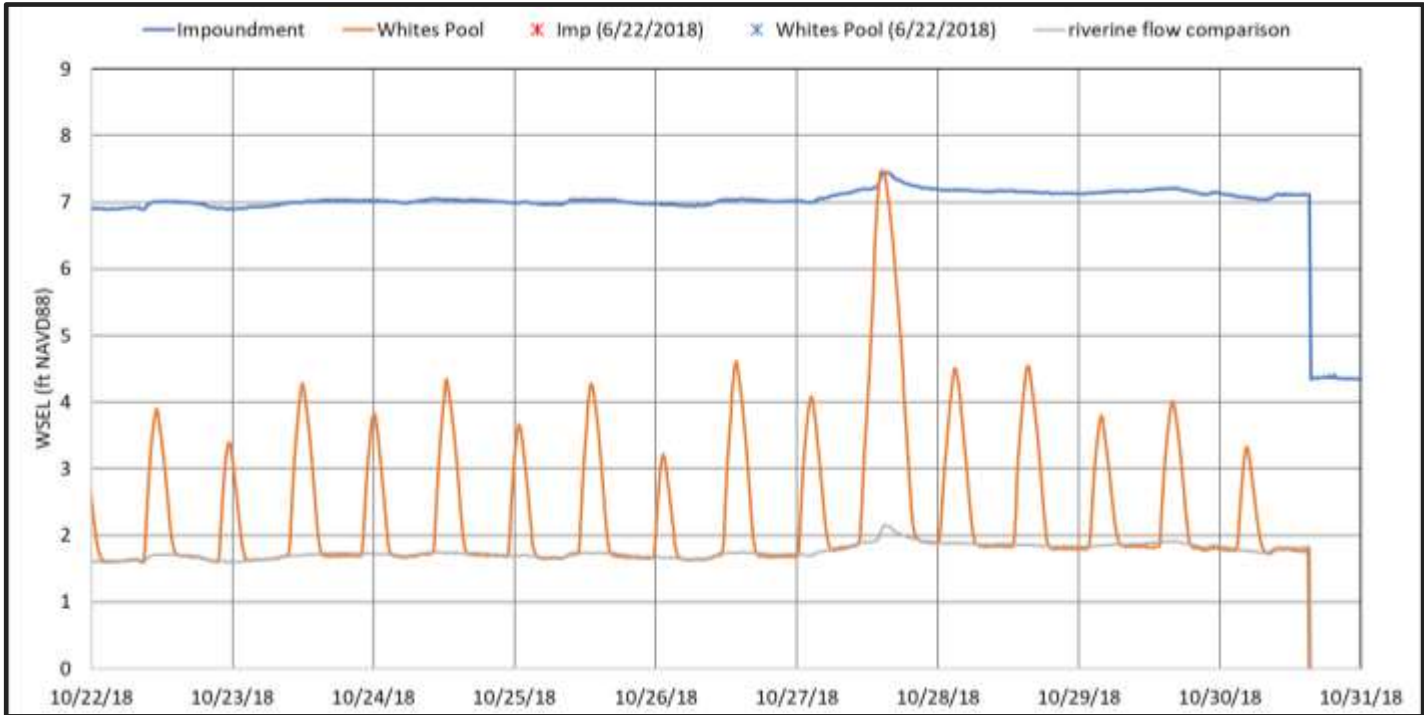
- Baltimore, MD tide data capturing storm event in December 2022
- Notice difference in **predicted** versus **verified** (measured) WSELs

Data and graphics from NOAA Tides & Currents:

<https://tidesandcurrents.noaa.gov/waterlevels.html?id=8574680&units=standard&bdate=20221220&edate=20221228&timezone=GMT&datum=MLLW&interval=6&action=>

We support the





# Tidal data (and datums)

- Data collection & analysis
- Near-shore tidal data characteristics (e.g., “riverine” at lower tides)
- Salinity
- Plant communities



# HoT Barrier Characteristics

- ✓ Located at Tidal Influence
- Impairment of Aquatic Resources
  - Aquatic Resource Connectivity
  - Natural Resource Resiliency
- Infrastructure Resiliency
  - Eliminate dam hazards
  - Improve transportation network resiliency



# HoT Barrier Opportunities & Constraints

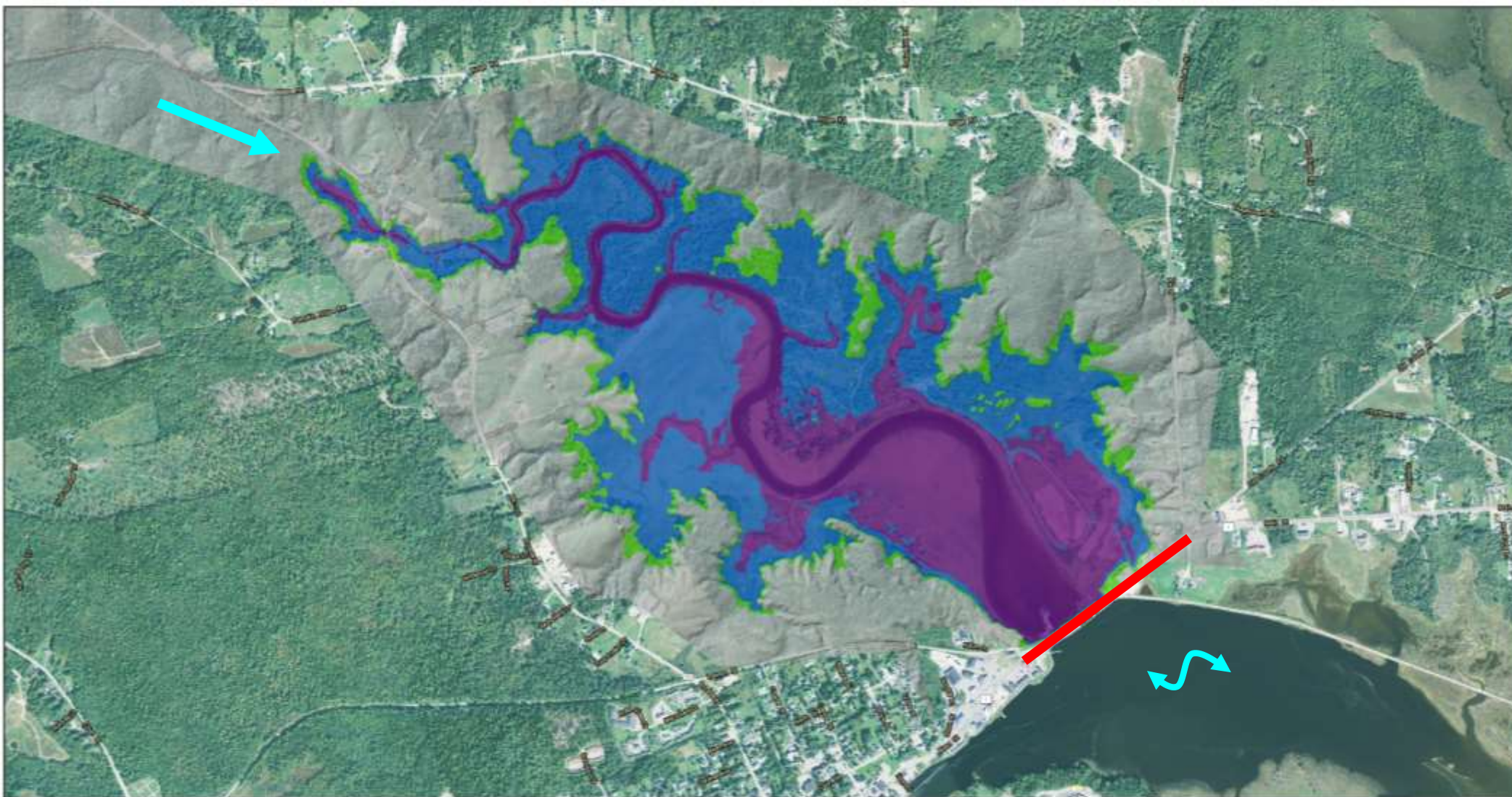
## Opportunities

- Improve aquatic connectivity
- Restoration aquatic habitat
- ✓ **Natural resource resiliency**
- Decouple infrastructure  
(bridge and dam)

## Constraints

- Increased flooding?





# Coastal Resiliency

- Infrastructure & Natural Resources



FEMA's National Flood Hazard Layer (NFHL) Viewer with Web AppBuilder for ArcGIS

Find address or place

**Issues**

- HoT barriers may be perceived as providing protection to landward areas
- Some HoT barriers may provide some protection
- Most HoT barriers not typically constructed, operated or maintained for flood protection

**Downsides**

- HoT barriers may prolong landward flooding due to limited drainage
- Impacts to transportation infrastructure

# A HoT Aquatic Barrier Story

## Orland Dam in Orland, Maine

### Issues:

- HoT dam
- Narramissic River / Orland River
- Good tidal range (13 ft/lunar cycle)
- Challenging fishway operation
- Dependent infrastructure:
  - 2 bridges
  - 1 culvert system
  - dry hydrant
  - residential wells

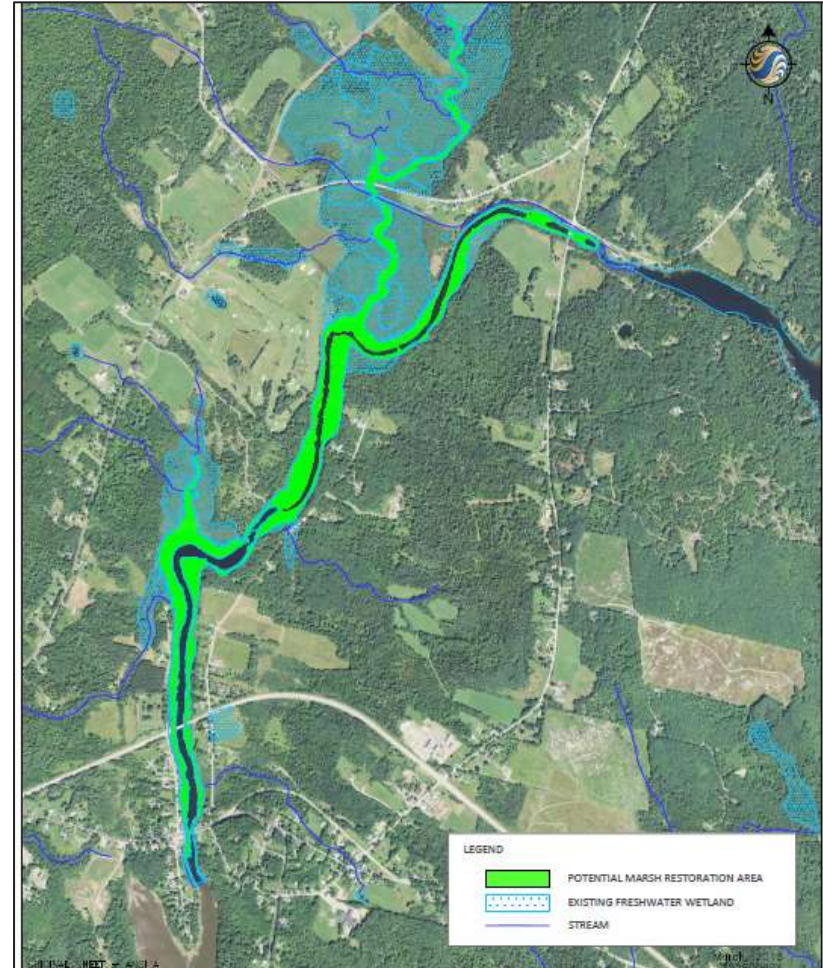
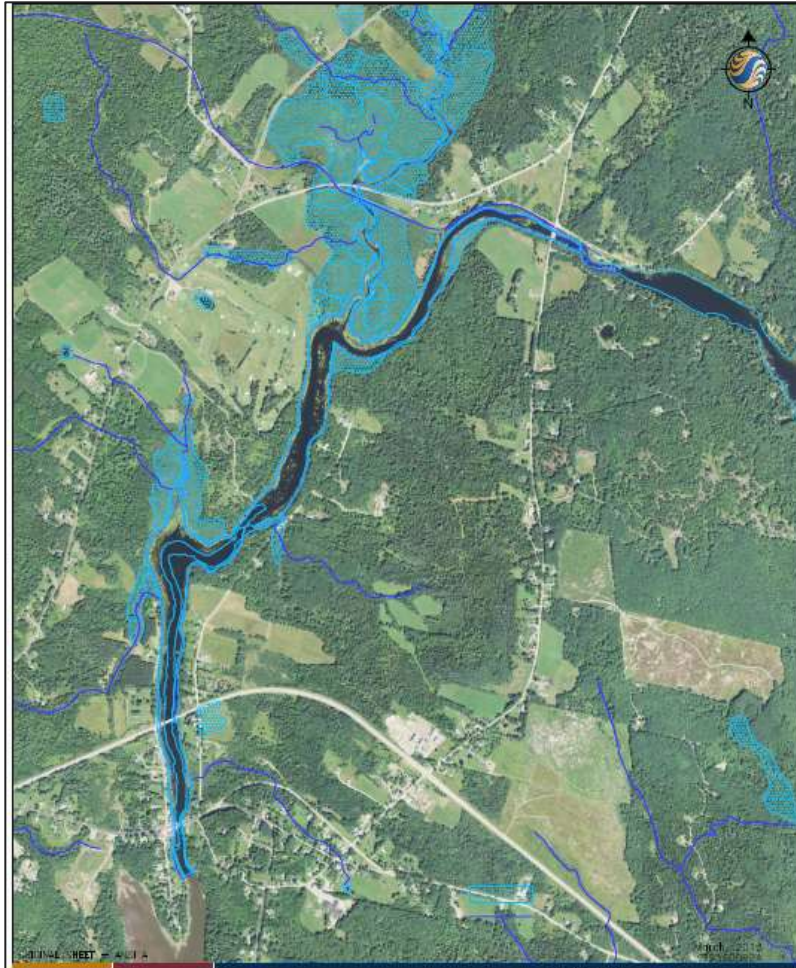


# A HoT Aquatic Barrier Story

## Orland Dam in Orland, Maine

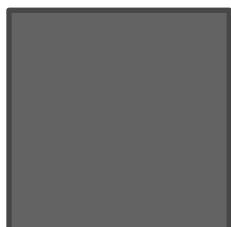
### Opportunities:

- Restoration of anadromous fish passage
- Restoration of 2+ miles of intertidal habitat





## Questions?



PLACEHOLDER FOR DIGITAL  
BROCHURE QR CODE; get from Ashley

Connect with us!