PATHWAYS OF INVASION:

RECREATIONAL BOATER ACTIVITY, AQUATIC INVASIVE SPECIES

DISTRIBUTION, AND LANDSCAPE LEVEL CONNECTIVITY TO INFORM

MANAGEMENT AND PREVENTION IN NEW YORK STATE





PAUL SMITH'S
COLLEGE
ADIRONDACK
WATERSHED
INSTITUTE

PROTECT CLEAN WATER, CONSERVE HABITAT, AND SUPPORT THE HEALTH AND WELL-BEING OF PEOPLE IN THE ADIRONDACKS THROUGH SCIENCE, COLLABORATION, AND REAL-WORLD EXPERIENCES FOR STUDENTS

THE ADIRONDACK PARK

- 11,000 LAKES AND PONDS
- 30,000 MILES OF RIVERS AND STREAMS
- 105 COMMUNITIES







STEWARDSHIP PROGRAM

- PREVENT NEW AIS
- LIMIT THE SPREAD OF ESTABLISHED AIS
- MITIGATE NEGATIVE
 IMPACTS

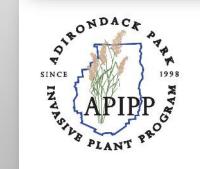


CURRENT PROGRAM

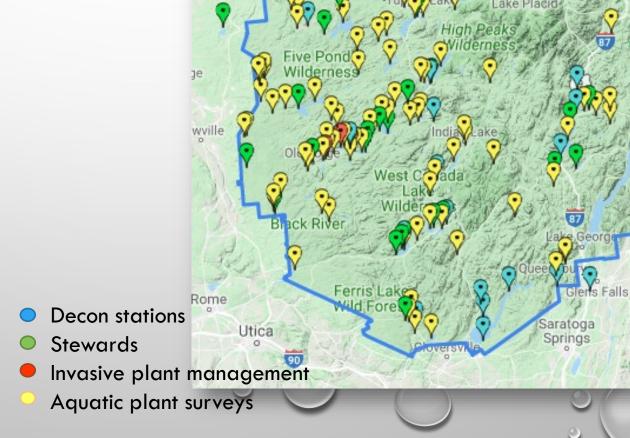




Lake George Park Commission







(11)

Ogdensburg Potam

(11)



PATHWAYS PROJECT

GOAL: HELP MANAGERS TO ALLOCATE AIS SPREAD PREVENTION RESOURCES EFFICIENTLY BY QUANTIFYING THE AXES OF INVASION RISK AND POTENTIAL PATHWAYS OF DISTRIBUTION IN THE ADIRONDACKS AND NORTHERN NEW YORK AND BY DEVELOPING A GENERALIZABLE MODEL THAT CAN BE APPLIED TO PRIORITIZE MANAGEMENT ACTIONS THROUGHOUT NEW YORK STATE AND OTHER REGIONS



OBJECTIVES

- PREDICT THE SPATIAL PATTERN AND INTENSITY OF RECREATIONAL BOATING
- PREDICT THE ABUNDANCE AND
 DISTRIBUTION OF AQUATIC INVASIVE SPECIES
- IDENTIFY AND PREDICT CONNECTIONS AND MOST LIKELY PATHWAYS OF SPREAD
- INCORPORATE FEEDBACK, DEMONSTRATE
 APPLICABILITY, INFORM LANDSCAPE LEVEL

 AIS MANAGEMENT ACROSS NY









GEOGRAPHIC/PHYSICAL

 LOCATION, AREA, ELEVATION, DEPTH, CONNECTED WATERS, TROPHIC CLASS, ALKALINITY, TEMPERATURE

AESTHETIC/IMPAIRMENT

• SHORELINE CHARACTERISTICS, ECOLOGICAL INTEGRITY, IMPOUNDMENTS, HABS, AIS, FISH ADVISORIES

AMENITIES

• LAUNCH TYPE, PARKING, FEES, RESTRICTIONS, NUMBER/SPECIES OF GAME FISH, MARINA, BOAT RENTAL, CAMPGROUND, CAMPSITES, DISTANCE TO NEARBY ROAD/TOWN/CITY



BEST MODEL

LEVEL OF MOTORBOAT TRAFFIC ON WEEKDAYS AND WEEKENDS BEST PREDICTED BY

- LAKE AREA
- DISTANCE TO INTERSTATE
- PRESENCE OF MARINA



WHICH LAKES ARE
VULNERABLE
BECAUSE THEY ARE
FAVORABLE TO AIS
ESTABLISHMENT?

EURASIAN WATERMILFOIL, VARIABLE LEAF MILFOIL

GEOGRAPHIC/PHYSICAL

 LOCATION, AREA, PERIMETER, ELEVATION, DEPTH, WATERSHED AREA, CONNECTED WATERS

ECOLOGICAL

• TROPHIC STATUS, TEMPERATURE, ALKALINITY, UPSTREAM INVADED WATERS, RICHNESS/ABUNDANCE OF NATIVE VEGETATION

HUMAN USE/IMPACT

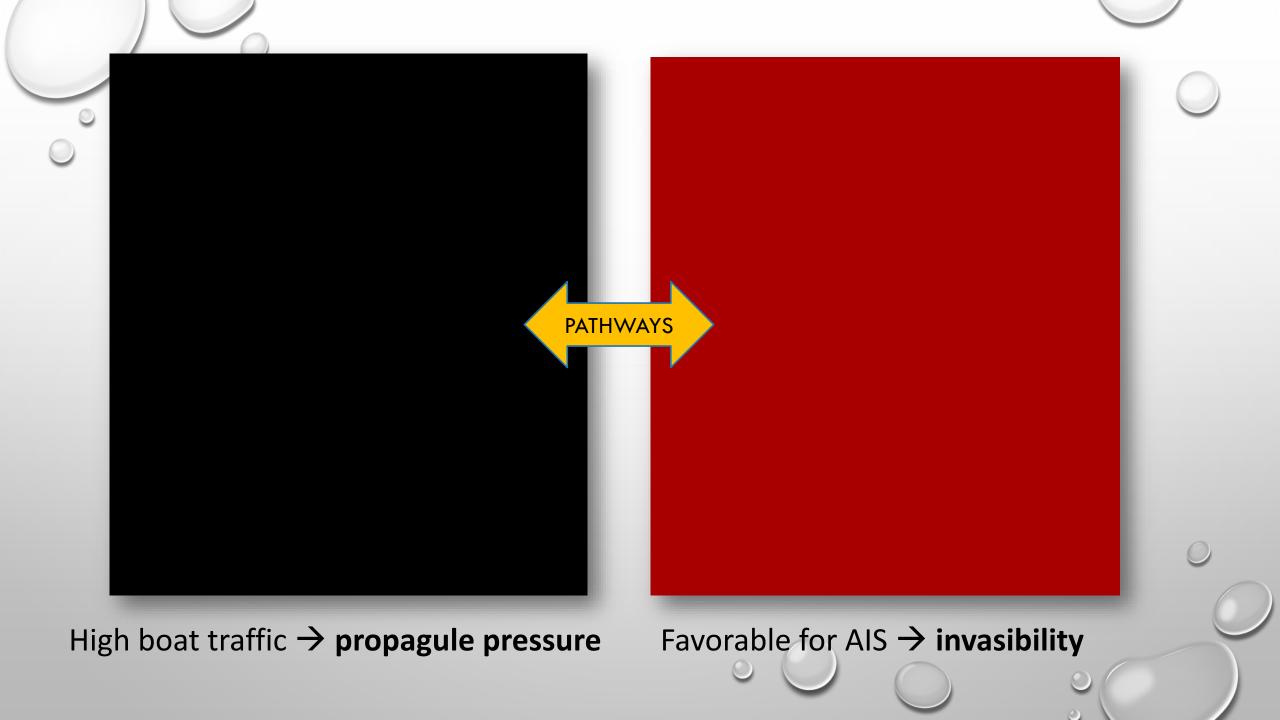
 ECOLOGICAL INTEGRITY, SHORELINE CHARACTERISTICS, AMENITIES, IMPOUNDMENTS, LEVELS OF USE, DISTANCE TO ROADS AND URBAN CENTERS



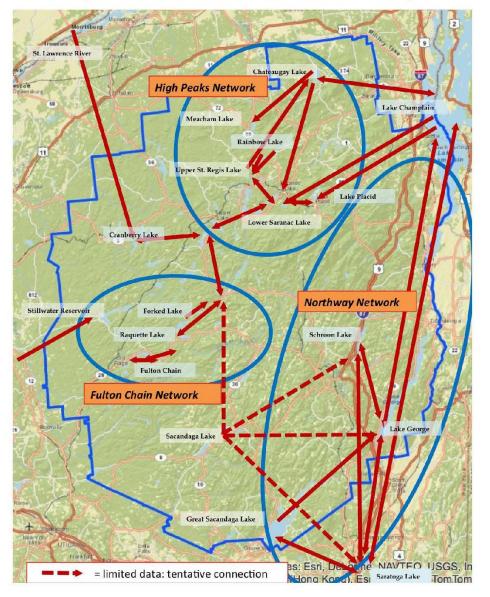
BEST MODELS

- EWM BEST PREDICTED BY
 - LONGITUDE
 - CONNECTED WATERS
 - NATIVE PLANT COMMUNITY RICHNESS
 - (# UPSTREAM INVADED WATERS)
 - (PREDICTED BOAT TRAFFIC)
 - (ALKALINITY)
 - (CALCIUM)

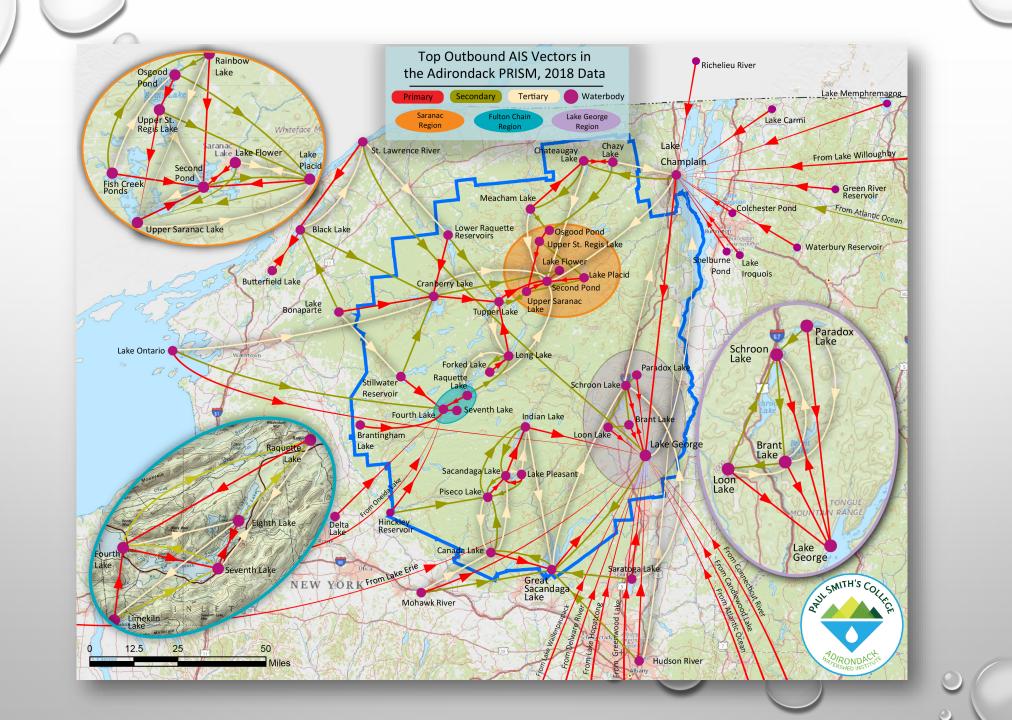
- VLM BEST PREDICTED BY
 - # UPSTREAM INVADED WATERS
 - LAKE AMENITIES
 - NATIVE PLANT COMMUNITY RICHNESS
 - (DISTANCE TO INTERSTATE)
 - (PREDICTED BOAT TRAFFIC)



Boat Launch Use Network Data, 2011-2013:
Primary Outbound Destinations from Boat Launches in the Adirondack Region



- JOHNSTONE ET AL. 2014
- 2011 2013 DATA
- 24 WATERWAYS
- OVERLAND TRANSPORT NETWORKS
- LINKAGE WATERWAYS
- INVASION SPREAD HUBS



CONCLUSIONS

- ADIRONDACK WATERS THREATENED WITH INVASION FROM BOTH NEAR AND FAR SOURCES; NEW INVASIONS CONTINUE
- ACCESS AND AMENITIES ARE PRIMARY DRIVERS OF USE
- RICHNESS OF NATIVE PLANT COMMUNITY, NUMBER OF INVADED UPSTREAM WATERS ARE PRIMARY DRIVERS OF AIS ESTABLISHMENT
- CONNECTIONS AMONG WATERWAYS PROVIDE OPPORTUNITIES FOR COLLABORATIVE MANAGEMENT
- REGIONAL, COORDINATED INTERVENTION FOCUSED ON INSPECTION AND DECONTAMINATION IS BEST APPROACH AT SYSTEM LEVEL

