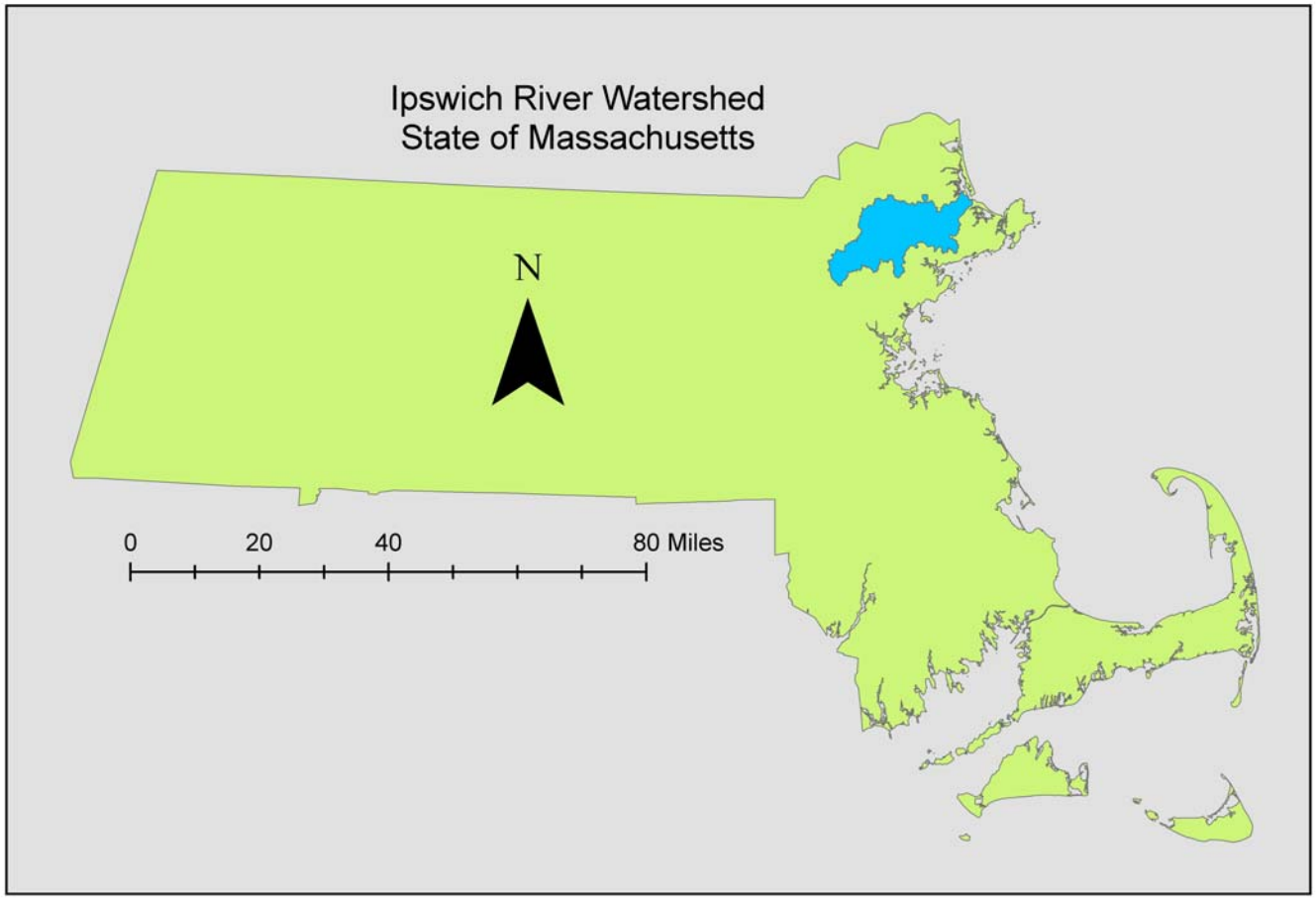
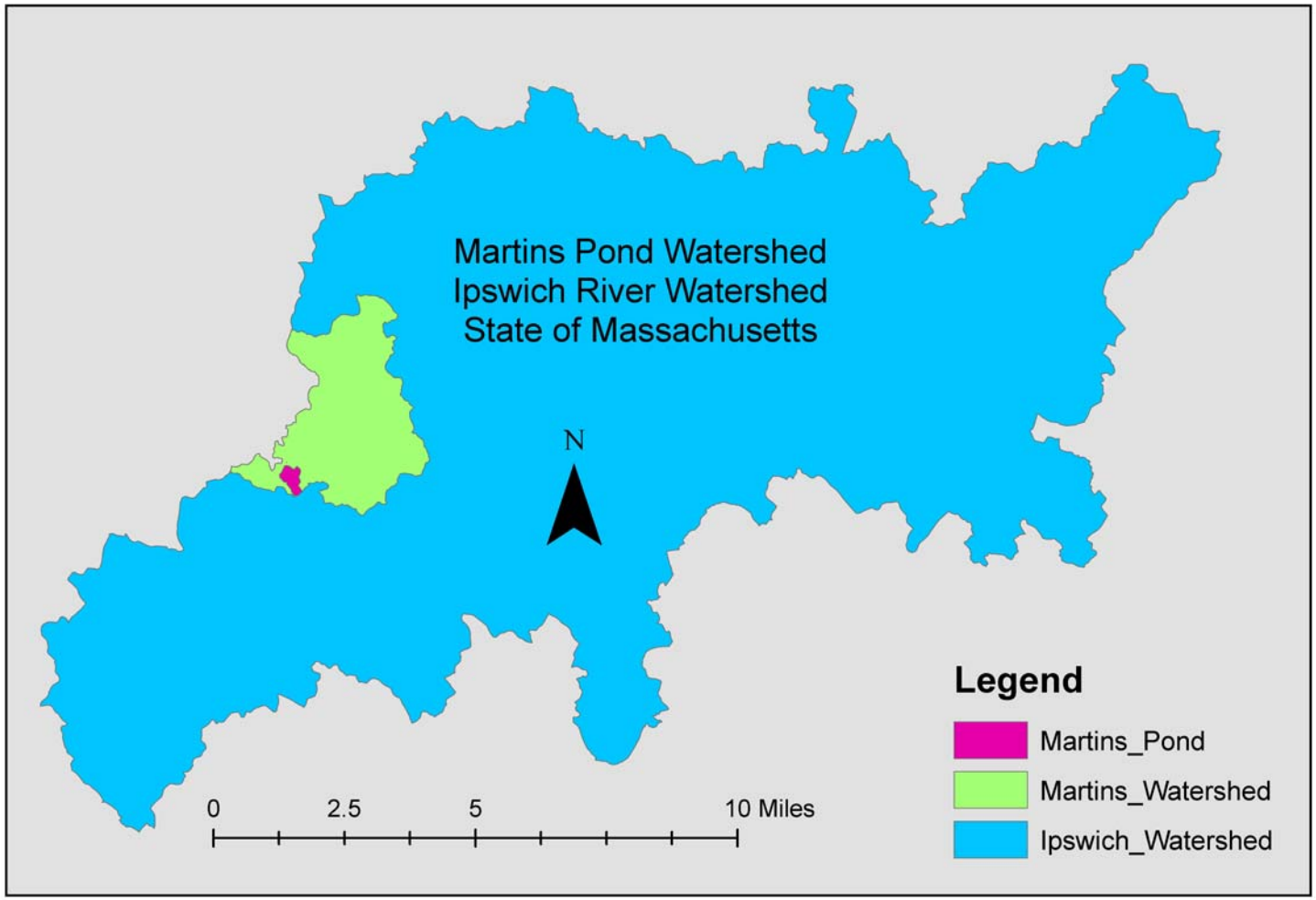
Implementing Solutions: The Martins Pond Shoreline Restoration and Sedimentation Reduction Project



Martins Pond is part of the Ipswich River Watershed, one of the 20 most stressed rivers in the United States



- Martins Pond is located in North Reading, 20 miles North of Boston
- The shoreline is densely developed, stretches are unnatural and eroded
- Town of North Reading awarded a grant restore the shoreline

Goals of the Project:

Reduce Erosion

Increase Vegetation

Questions for GIS:

Where is the erosion?

How bad is it?

Why is it eroded?

Who owns the parcel?

Where should funds be allocated?

First Step: Shoreline Survey using GPS Determine Attributes

<u>Erosion Value 0 to 5</u>

0 Natural, no erosion
1 Natural/Landscaped, minor or no erosion
2 Landscaped, spots of erosion
3 Landscaped, some erosion
4 High erosion, failing wall
5 Exposed gravel, undercut, imminent wall failure

<u>Vegetation Value 0 to 5</u>

0 Untouched, Natural
1 Natural >15 ft to shoreline
2 Natural >10 ft to shoreline
3 Landscaped <10ft to shoreline
4 Landscaped to <2ft to shoreline
5 Gravel to shoreline, no vegetation

Other data collected: Wall type and condition, dock presence

Observations: Adjacent homes with different landscaping practices.

Erosion Value 5
Vegetation Value 5

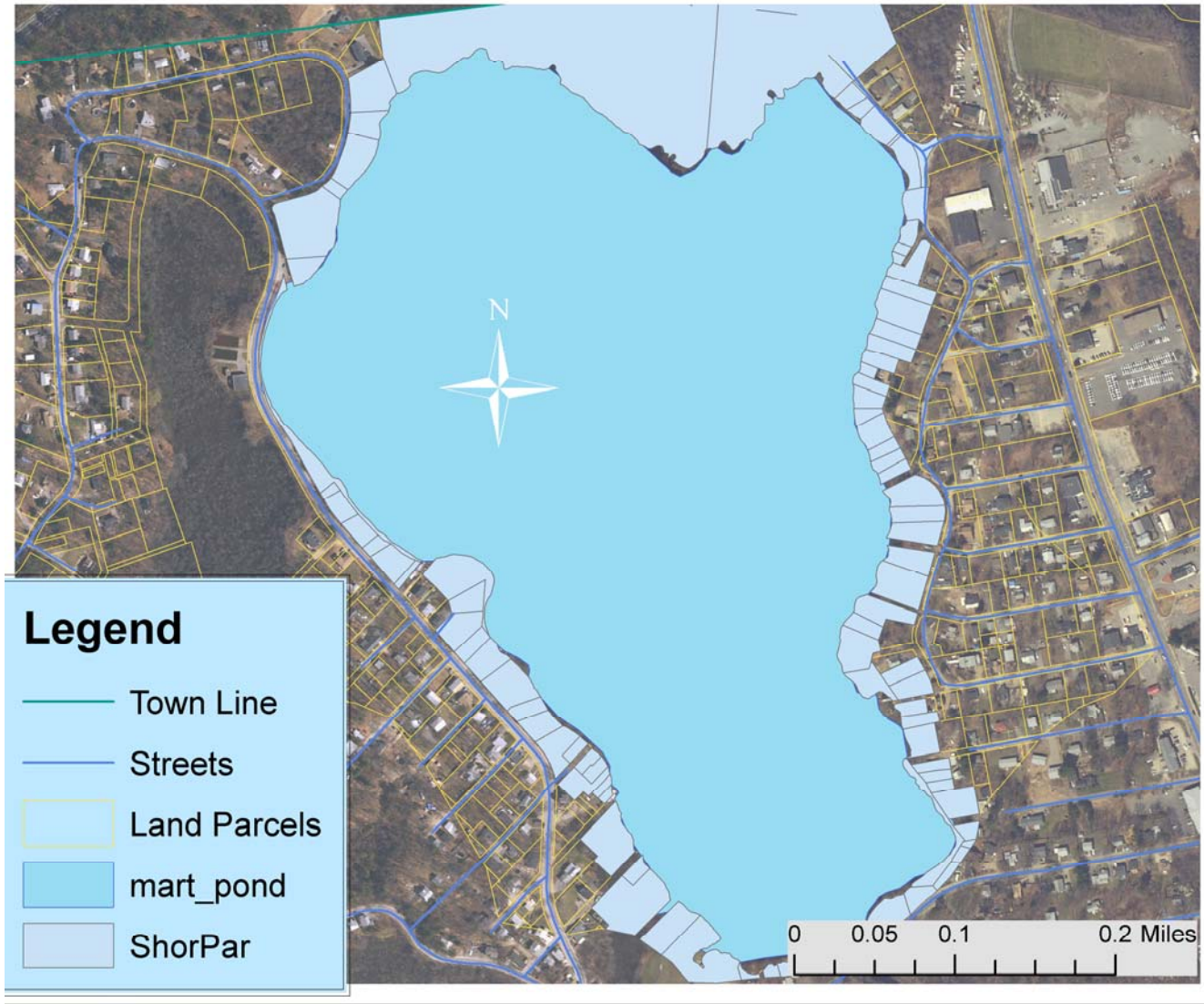
Erosion Value 0
Vegetation Value 1

The barren shoreline is eroding under the yellow boathouse and all along the wall.
In contrast, the vegetated neighbor has protection from ice, wind, and waves, and shows no signs of erosion.

Observations: The effect of vegetation on parcels with similar slope.

Owner at left has been cited for clearing shoreline, but attempts to hold back the soil have not included vegetation, and continue to fail. Parcel at right has tree canopy and untouched hill, very little erosion.

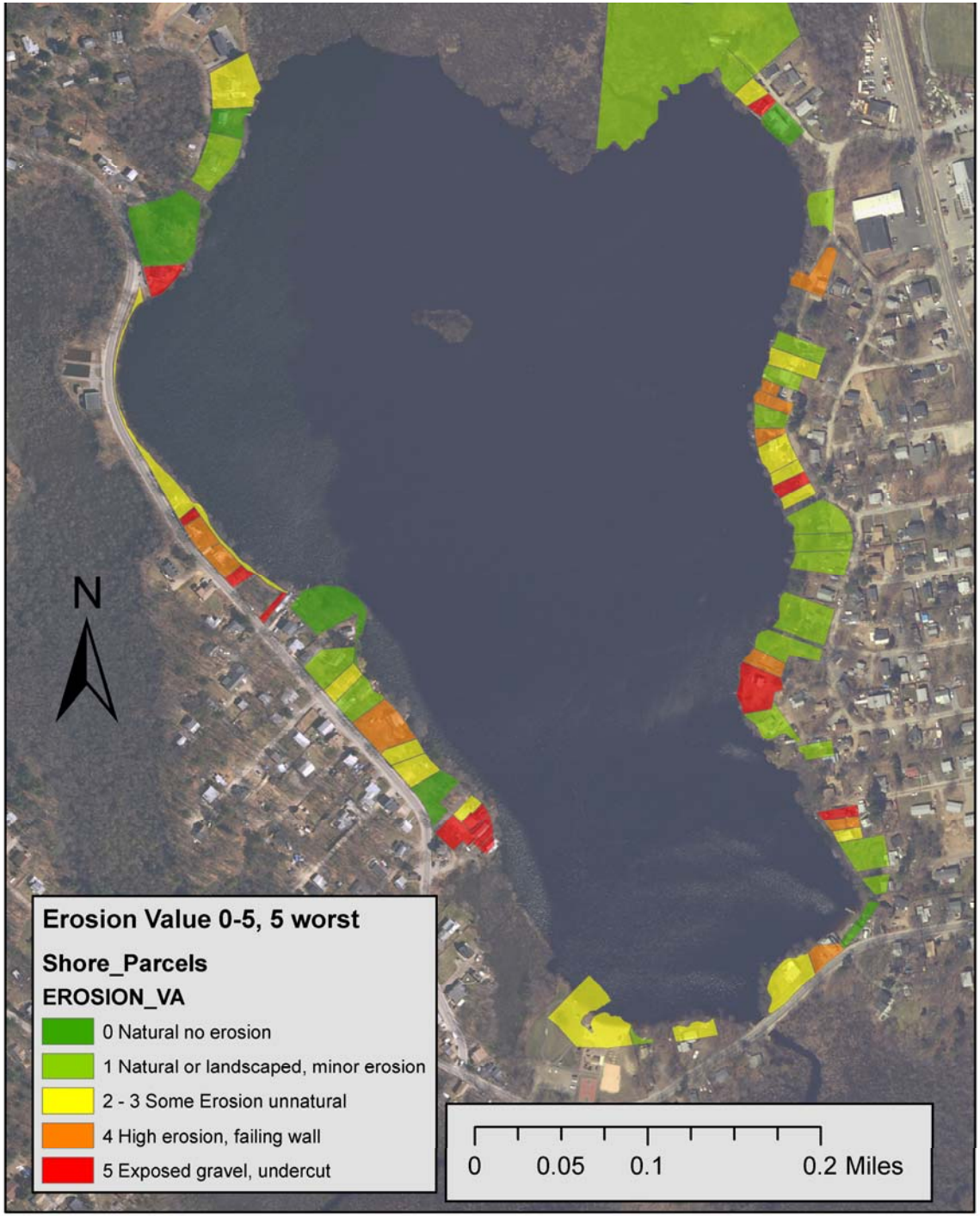
Step Two: Create layer of shoreline parcels.
Select by location from North Reading GIS land parcel layer within 20ft of Martins Pond polygon. Edit outliers in Arc Editor.



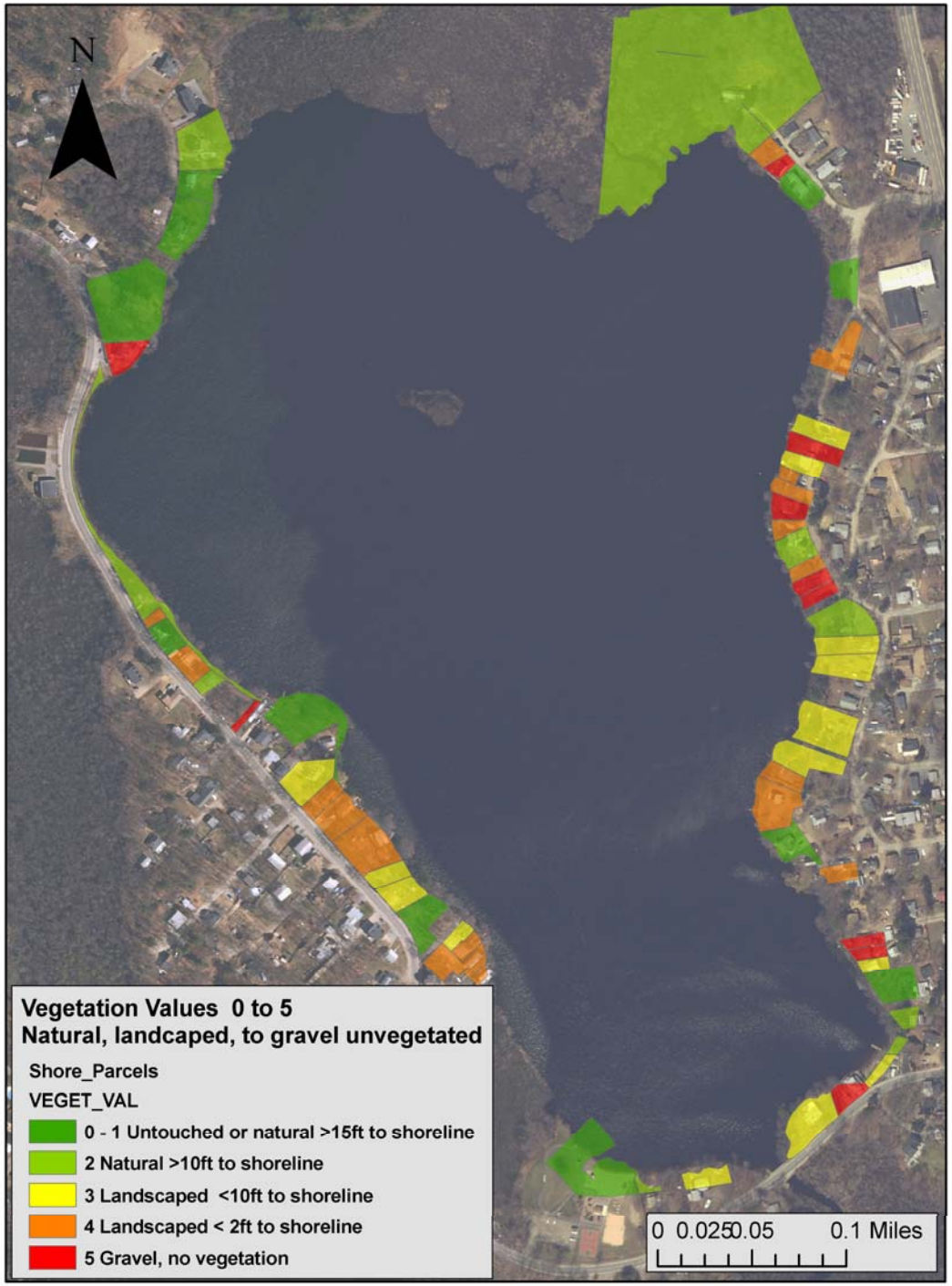
Step Three: Download waypoints and build attribute table. Waypoints had to be edited to place them within parcel polygons so a one to one cardinality could be achieved for the inside join with shore parcels layer as destination.

BEFORE

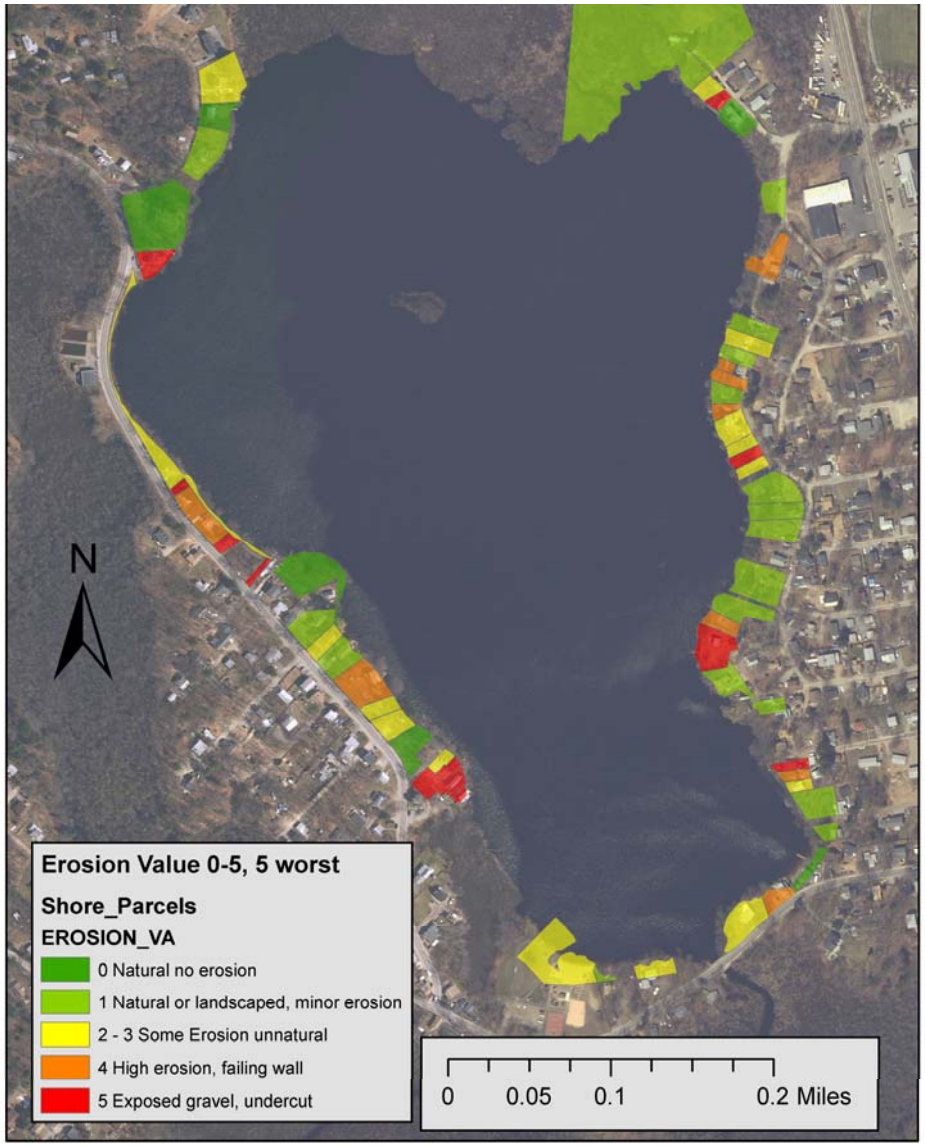
AFTER

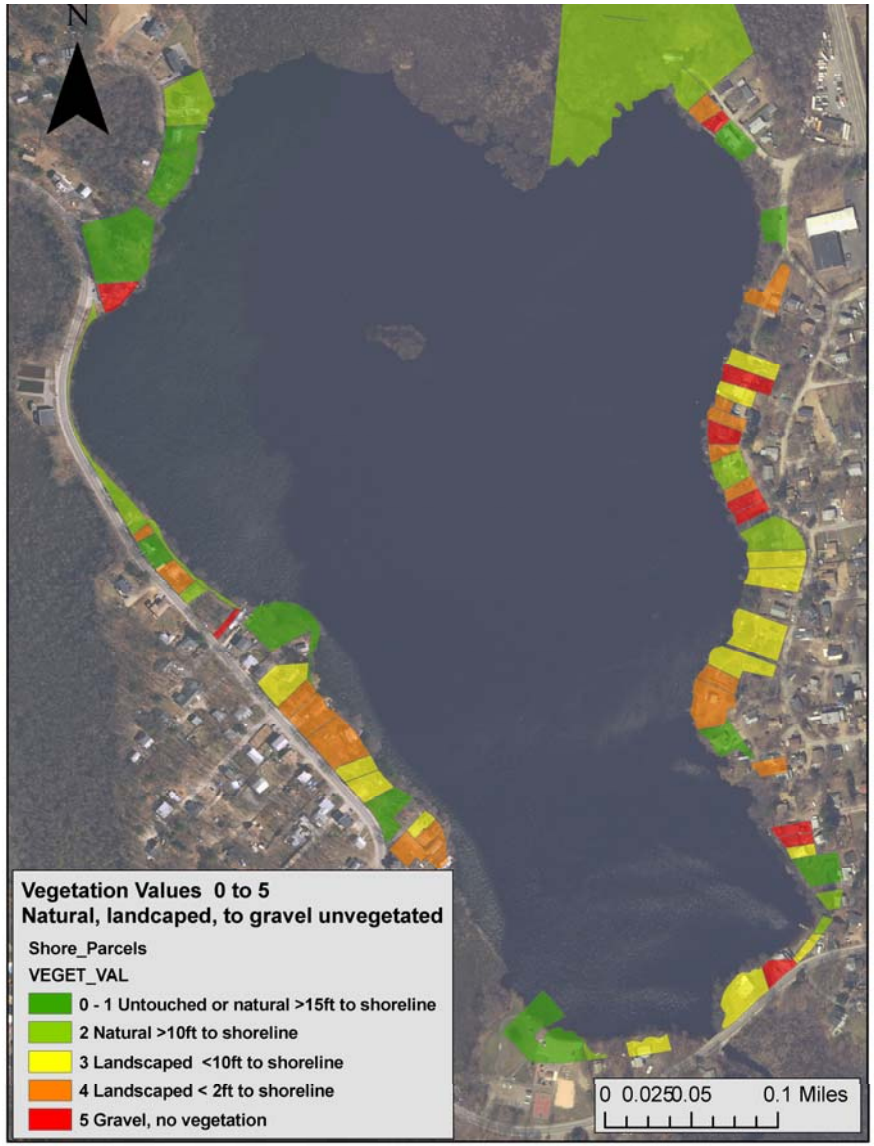


Step Four:
Start seeing results.
Create a graduated color thematic map using the Erosion Value field.
Where is the erosion?
How bad is it?
Look for Red and Orange.



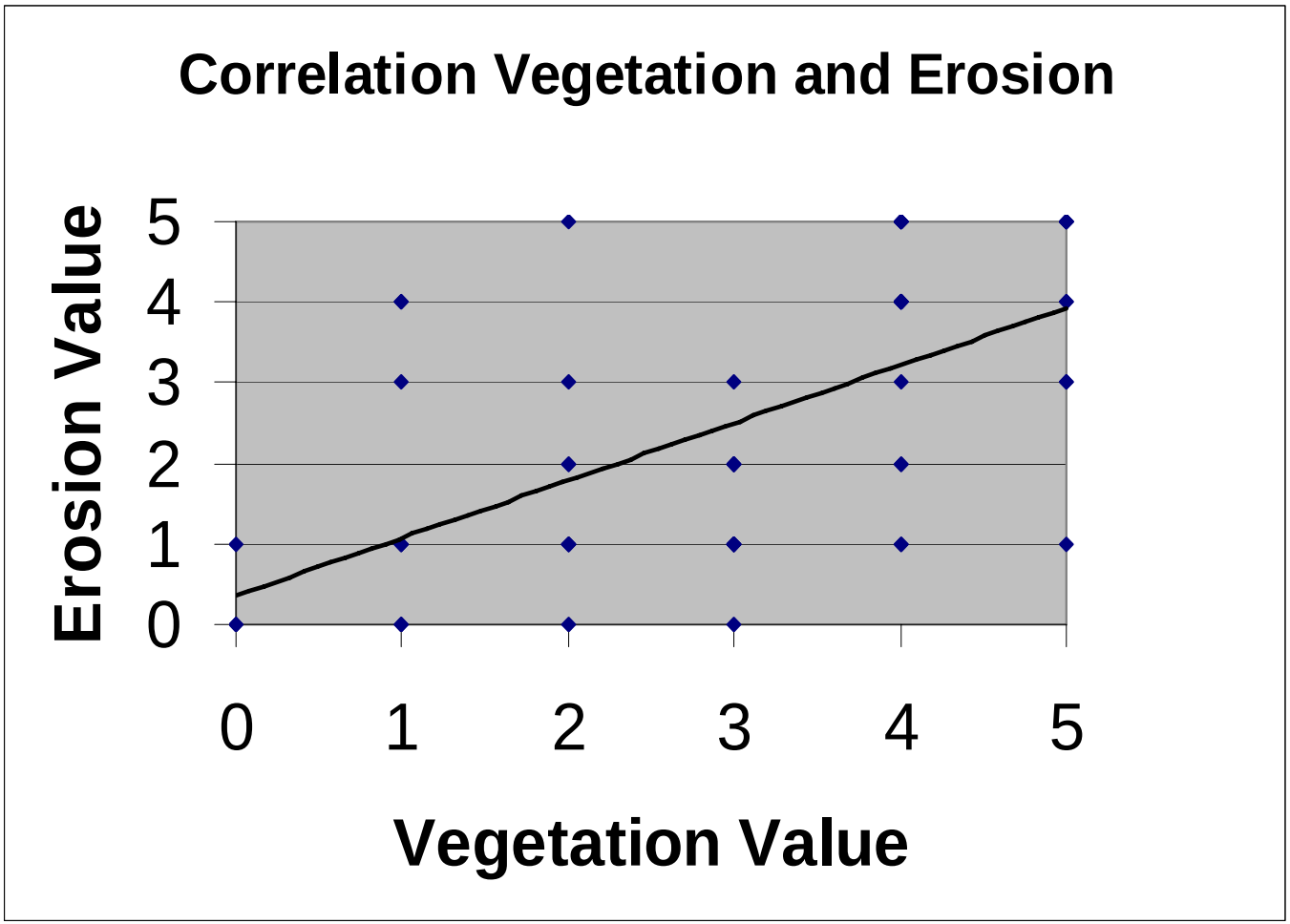
Step Five:
More results.
Create a graduated color thematic map using the Vegetation Value field.
What areas lack vegetation or are highly landscaped?
How bad is it?
Look for Red and Orange.





Why is it eroded? Lack of vegetation and landscaping practices appear to have a positive relationship in most cases.

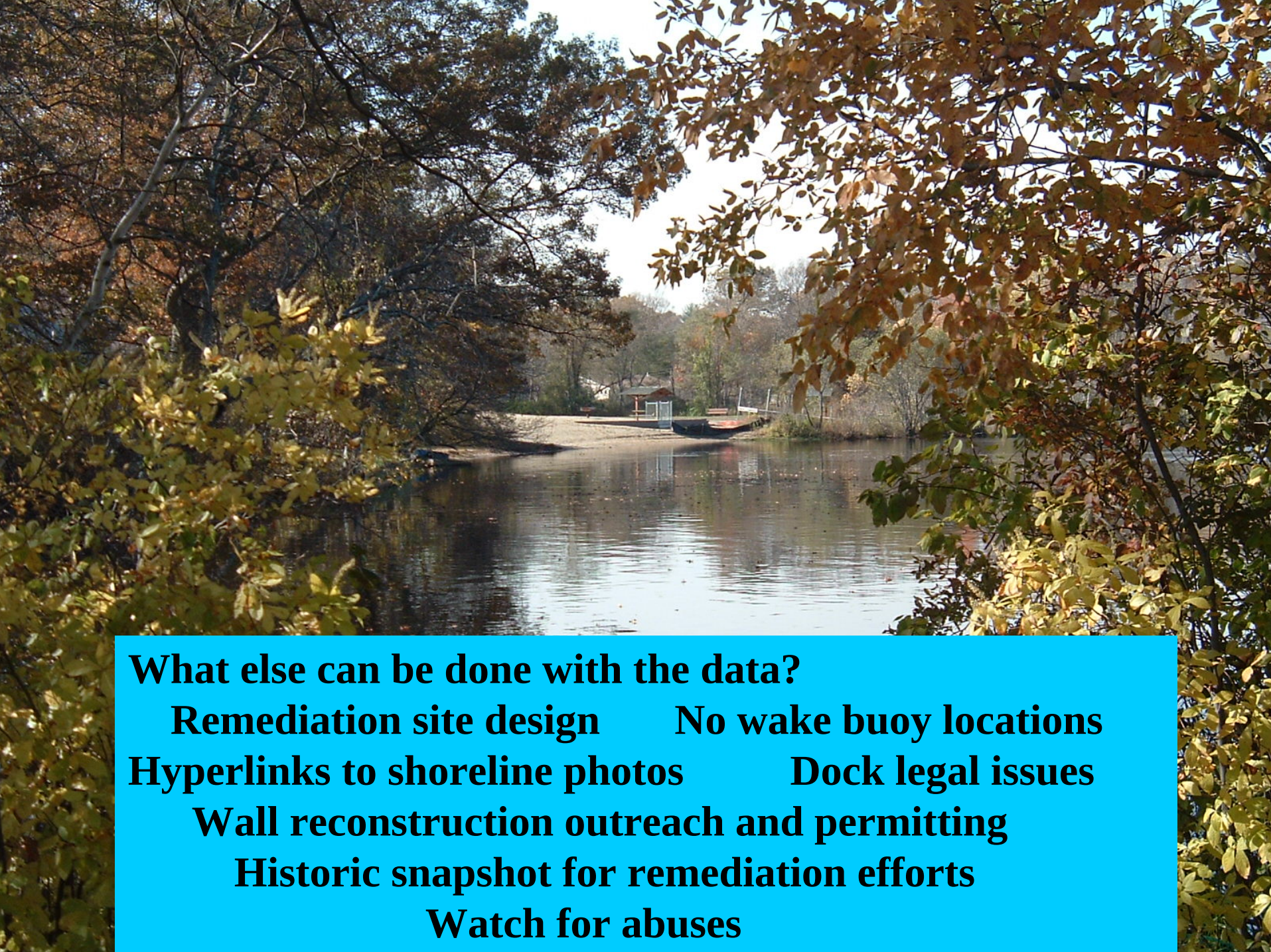
Step Six: Chart Erosion Value and Vegetation Value. Why is it eroded? The regression shows that as the level of vegetation decreases, erosion increases.



We have spatially located the eroded and least vegetated parcels. The graph supports the promotion of vegetation for effective restoration efforts. But there is not enough money in the grant to fund all parcels. Where should funds be allocated?

Parcels with Erosion **or** Vegetation values of 5 are shown in red . This group of 17 parcels is our “A” list of target shoreline residents to solicit for inclusion in remediation efforts.

Parcels with Erosion **or** Vegetation Values of 4 are shown in pink. This group of 13 are the “B” list of target properties.



What else can be done with the data?

Remediation site design **No wake buoy locations**

Hyperlinks to shoreline photos **Dock legal issues**

Wall reconstruction outreach and permitting

Historic snapshot for remediation efforts

Watch for abuses