Saving the Ribbon of Green: Assessing Riparian Habitat Condition and Restoration Opportunities in the Great Basin using Remote Sensing Techniques

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120 + staff
150,000 + members
Trout Unlimited
Beyond Idaho

- Marys River Basin
- Lahontan cutthroat trout
Redband (Rainbow) trout

- Shoefly Creek
COLD
CLEAN
CONNECTED
Owyhee and Salmon Falls Creek Basins: Can we accurately map riparian condition?
Can we accurately map riparian condition? And do those maps predict redband trout occurrence and abundance?
2 models: occurrence (logistic regression) and abundance (quantile regression) as a function of:

Landscape variables within 5m buffer:
- % Woody vegetation (NAIP)
- % Woody vegetation (NLCD)
- NLCD % Canopy
- Predicted stream temperature (US Forest Service NorWeST)

Field measured variables at sampling locations:
- Channel width, depth, velocity, slope
- Pool depth
- Substrate (% cobble, fines, sand, boulder)
- Bank stability
- Vegetation cover, height
- Instream cover (aquatic vegetation, large wood)
- Stream shading
Susie Creek:
How do land management practices affect riparian habitat?
Riparian vegetation change within this view:

1991: 2.25 acres

2013: 8.4 acres (+373%)
Susie Creek

+ 16 acres riparian (66%)
+ 5 acres water (94%)

+ 70 acres riparian (171%)
+ 17 acres water (260%)

+ 18 acres riparian (218%)
+ 1 acres water (100%)
Susie Creek - Carlin allotment

Change from hot to cool season grazing

Wildfire

Wildfire
OR Naip classification differencing

```javascript
var geometry = GeometryCollection()
```

// DATASET - NAIP
// Nevada years - 2006 (No IR), 2010, 2013

// Add with basin
var fc = ee.FeatureCollection("ft:1sFw-UnZ5xn2zMagO/DH73_SC10MYY4ssz79770Pj0Qg");
Map.addLayer(fc, {color: '080000'}, 'basin', false);

var collection = ee.ImageCollection('USDA/NAIP/DOQQ');
date = 2012;
var collection_rgb = collection.select(['N', 'G', 'B']);
var collection_rgb.filterDate(date = '2012-01', date = '2012-12').max();

// Make a collection of only images that have an infrared band.
var collection_rgb = collection
  .filter(ee.Filter.listContains('system:band_names', 'N'))
  .map(function(image) {
    return ee.Image(image) // Here the collection must be reduced to a single image with the max
    .select('N');
  });
var naip_ndvi = collection_rgb.expression((name, red) => (red + name))
```

Geometry imports
Acknowledgements

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Susie Creek

1991 and 2013 aerial photos
Riparian vegetation change within this view:

1991: 1.7 acres

2013: 6.4 acres (+ 377%) and additional 3.8 acres in transition
- Locate historical aerial photos
- Scan and georeference
- Interpret vegetation
- Compare to current
- Consider the weather
- Consider grazing management
- Consider the fish
Susie Creek - Trend in maximum summer NDVI from Landsat vs. precipitation for riparian zones in 2 allotments that switched grazing management from warm season to cool season grazing
Riparian Airphoto Analysis Form (attach on back of photo when completed)

Stream Name: Cottonwood Cr.  
Airphoto Number: 3-1-9

Today's Date: 12-3-86  
Interpreter(s): Delany

Dominant Species Groups

1. Herbaceous Vegetation = minimum mapping unit (MMU) is 1 acre. Herbaceous vegetation is dominant and comprises 75% or more of the ground cover. Shrubs and trees may be present but amount to less than MMU.

2. Shrubs = MMU is 1 acre. Shrubs are dominant and comprise 75% or more of the canopy. Trees and herbaceous vegetation may be present but amount to less than MMU.

3. Trees = MMU is 1 acre. Trees 10' high are dominant and comprise 75% or more of the canopy. Shrubs and herbaceous vegetation may be present but less than MMU.

4. No Riparian Vegetation (NRV) = a linear measurement of the length of stream where there is an absence of riparian vegetation in MMU amounts. If less than 200 feet is length, disregard and include in other types (dominant or mixed).

Mixed Communities

MMUs of mixed types are 1 acre. Trees, shrubs, or herbaceous vegetation less than 75% cover with a lesser amount of one or two other groups included in a mixed community.

5. Shrub/herbaceous vegetation

6. Tree/herbaceous vegetation

7. Tree/shrub

8. Tree/shrub/herbaceous vegetation

Total Riparian Acres: 5.0
Trout like it cool...
Trout like it shady...
Aerial and satellite imagery analysis with BLM for Willow-Whitehorse Creeks, OR


Satellite imagery: 1985-2015

2011 max. growing season NDVI

2014 max. growing season NDVI

Fire in 2012