Ecological Condition Assessment of the Ozark National Scenic Riverways

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Missouri Resource Assessment Partnership Map Series 2009-1 University of Missouri-Columbia http://www.cerc.usgs.gov/morap

Introduction

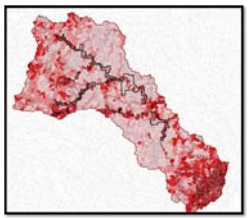
The ONSR was the first federally protected riverway, preserving 134 miles of the Current and Jacks Fork Rivers and surrounding areas. ONSR was established in 1964 with 80,000 acres in south central Missouri,within Carter, Dent, Shannon, and Texas counties. ONSR consists of three primary management units (1) Upper Current above the confluence with the Jacks Fork, (2) Lower Current below the confluence with the Jacks Fork, and (3) the Jacks Fork.

Threats/Stressors

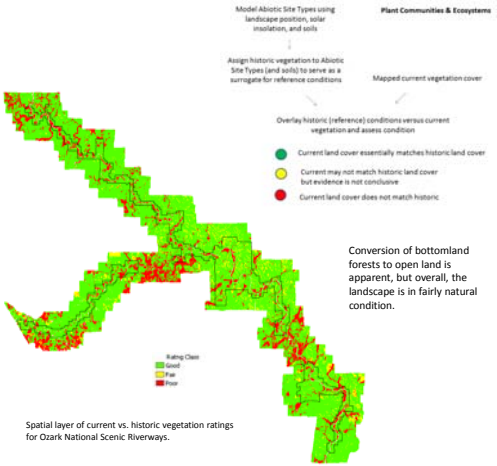
Threats affecting each park region.

Upper Current	Lower Current	Jack's Fork
Impervious Surface	Impervious Surface	Impervious Surface
Airports	Airports	Airports
Dams	Lead Mines	Dams
Road/Stream Crossings	Dams	Road/Stream Crossings
Wells	Road/Stream Crossings	Wells
Cropland	Wells	Cropland
Leaking Underground Storage Tanks	Cropland	Leaking underground Storage Tanks
Pasture	Leaking underground Storage Tanks	Pasture
Roads	Pasture	Roads
Waste Water Treatment Facilities	Roads	Other Mines
Toxic Releases	Other Mines	Railroads
High Intensity Power Lines	Railroads	Railroad/Stream Crossings
Crop Pesticides	Railroad Stream Crossings	Waste Water Treatment Facilities
Headwater Impoundments	Waste Water Treatment Facilities	High Intensity Power Lines
CAFOs	Toxic Releases	Crop Pesticides
NPDES	High intensity Power lines	Headwater Impoundments
Population Change	Crop Pesticides	CAFOs
	Headwater Impoundments	NPDES
	CAFOs	Population Change
	NPDES	
	Ditched/Channelized Streams	
	Population Change	

For more information see MoRAP Project: Developing Synoptic Human Threat Indices for Assessing the Ecological Integrity of Freshwater Ecosystems in EPA Region 7, available Fall 2009.



Landscape Condition

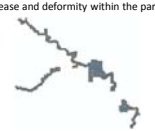


Conversion of bottomland forests to open land is apparent, but overall, the landscape is in fairly natural condition.

Spatial layer of current vs. historic vegetation ratings for Ozark National Scenic Riverways.

Biotic Condition

Agricultural fields, pastures, woodlots, and old fields occupy some formerly forested areas, especially in floodplains, but most of the area is forested with semi-natural communities. In terms of the major streams, the floodplain of the Lower Current, Jacks Fork, and Upper Current are in progressively worse condition. Oak decline may be adversely impacting older upland stands in the region. Fish communities appear in relatively good condition, although the introduction of trout may have reduced populations of native smallmouth bass. Although few samples exist, hellbenders appear to be suffering from high levels of disease and deformity within the park.



Park Boundary

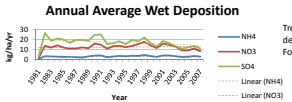
Buffer of Park Boundary

Current River Hills Subsection

Potential vegetation was intersected with current vegetation to create a rating table of current vegetation based on potential vegetation. The results are measured in Hectares and % of current vegetation classes that are found within potential vegetation classes.

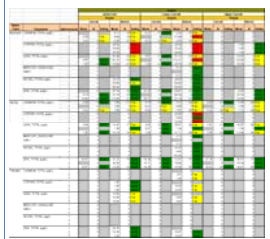
Potential Veg	Pine and Pine-Oak Forests	White Oak Forests	Riverfront and Bottomland Forests	Igneous Glade/Woodland Complex	Dolomite Glade/Woodland Complex	Active Channel/Gravel Bar Complex	Mixed Oak-Hickory Forests
Dolomite Glade/Woodland Complex	3167.93	1546.64	2.46	17.05	1353.18	2.94	3572.72
Igneous/Glade Woodland Complex	1.74	5.83	0.08	897.15	19.18	0.00	311.63
Mixed Oak-Pine/Vaccinium, Desmodium Dry-mesic Alfic (Chert) Forest (Woodland)	1213.76	2367.71	117.53	8.47	1484.88	15.13	5362.26
Mixed Oak(Scarlet, Black)-Hickory/Dogwood Dry-mesic Ultic (Chert, Igneous, Bottomlands) Forest	62.93	12.75	0.07	264.95	18.29	0.03	579.45
Mixed Oak(White and Red)/Dogwood Dry-Mesic (Chert, Igneous, Bottomland) Forest	24.59	30.79	0.00	0.12	6.19	0.00	215.59
Shortleaf Pine-Oak/Vaccinium (Bluestem) Dry Ultic (Chert) Woodland	470.23	36.38	0.26	0.99	287.79	0.00	5107.17

Chemical & Physical Characteristics and Water Bourne Pathogens



Trends in annual average wet deposition for the University Forest NADP site in ONSR.

Condition ratings for individual metals indicators within the ONSR.

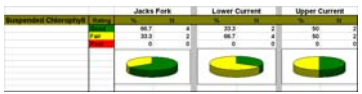


Total nitrogen and total Kjeldahl nitrogen in the Current and Jacks Fork River are both a concern, although the sources of these have not been identified. Five municipal wastewater treatment plants are upstream, and septic systems or the trout park (Montauk) may be sources. Cadmium, copper, and lead are all concerns as well, although concentrations may be dropping due to better mining technology. Surprisingly few data exist for water chemistry. Fecal coliform concentrations are a concern, especially on the Jacks Fork, and appear to be coming mainly from horses and cattle. Air quality data are largely unavailable for the immediate area of the park, although wet deposition of N is high at the nearest sampling station.

Ecological Processes

Suspended chlorophyll condition ratings for each park subunit at ONSR.

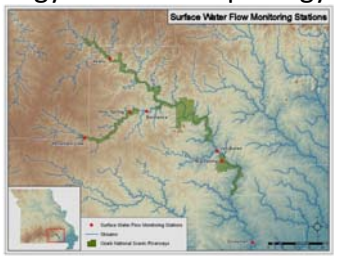
Suspended chlorophyll indicators are generally good or fair, although readings are up in recent samples, suggesting a trend toward higher primary production within the park. The Upper Current River has generally higher chlorophyll concentrations, even though it is cooler than the Jacks Fork or Lower Current. This indicates that increased primary production may be due to increased nutrient content in the Upper Current. Although the causes are not known, the floodplains of the Upper Current may support more cattle or more cropland. Causes for the increase in nutrient content in the Upper Current need investigation.



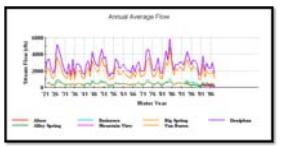
Suspended Chlorophyll	Rating	Jacks Fork %	Jacks Fork N	Lower Current %	Lower Current N	Upper Current %	Upper Current N
	Good	66.7	4	33.3	2	50	3
	Fair	33.3	2	66.7	4	50	3
	Poor	0	0	0	0	0	0

Condition ratings for individual suspended chlorophyll (µg/L) indicators within the ONSR.

Hydrology and Geomorphology



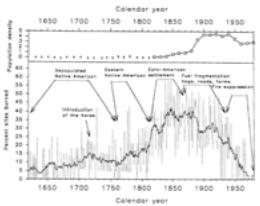
Selected surface water flow monitoring stations (gages) for ONSR.



Average annual flow of all of the monitoring stations over their period of record.

ONSR main stem streams contain more coarse sediment and less fine sediment versus pre-European settlement. The sources of coarse sediment might include unstable stream banks and upland soils, whereas increased run-off rates due to reduced cover (e.g. heavy grazing, impervious cover) might be reducing fine sediment retention. Flow regimes are generally good throughout the park.

Natural Disturbance Regimes



From Guyette, 1997. Depicts how fire frequency increases as human population increases until about 1850 when fire suppression efforts began. Currently, a fire regime is virtually nonexistent.

Fire was the primary historic natural disturbance, and fire has been suppressed throughout the Ozarks. Fire may have kept glades more open in pre-European times, and managers have long-recognized the need for prescribed burning of upland glades, savannas, and woodlands.

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