

Chesapeake & Ohio Canal National Historical Park

Natural Resource Condition Assessment Brief

National Park Service
U.S. Department of the Interior

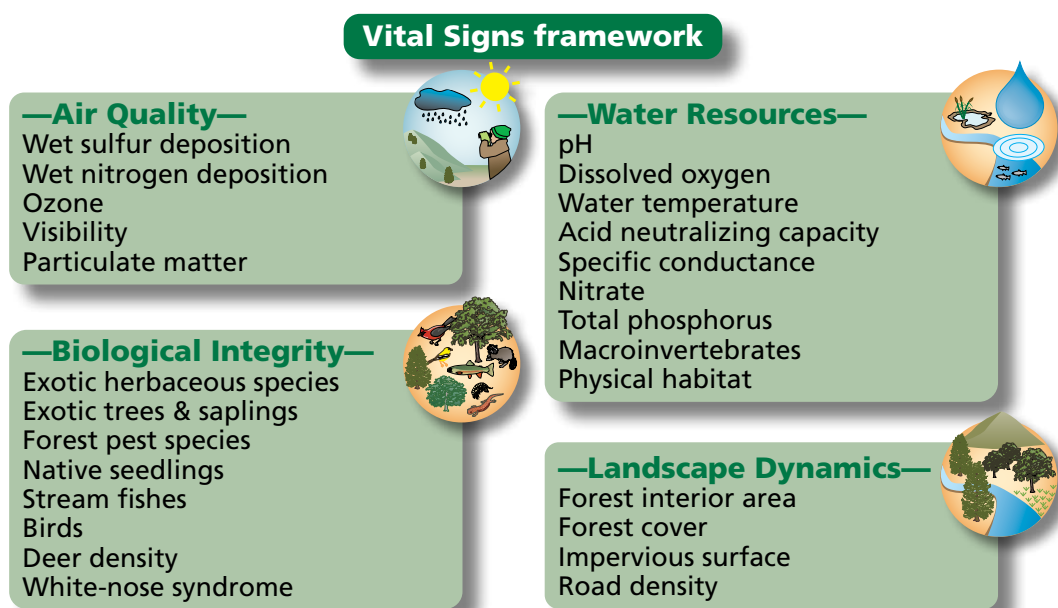


Natural Resource Condition Assessments (NRCAs) evaluate the current condition of a subset of natural resources and resource indicators in a national park. This brief summarizes the findings of the 2014 NRCA for Chesapeake and Ohio Canal National Historical Park.

Natural resources in Chesapeake and Ohio Canal National Historical Park are in moderate condition overall.

A vital signs framework was used to assess natural resource conditions within Chesapeake and Ohio Canal National Historical Park. Within each vital sign, we identified indicators like ozone levels, stream water pH, and the number of native tree seedlings present, and sourced related data. We established reference conditions for each indicator and calculated

their percentage attainment of reference condition. A score for each vital sign category (air quality, biological integrity, water resources, and landscape dynamics) was calculated by averaging indicator scores in that category. We then averaged vital sign categories to calculate an overall park assessment. Based on key vital sign findings, management recommendations were developed and data gaps were identified.



Natural resource condition assessment of Chesapeake and Ohio Canal National Historical Park.

Vital Sign	Reference condition attainment	Current condition
Air Quality	12%	Very degraded
Water Resources	60%	Good
Biological Integrity	43%	Moderate
Landscape Dynamics	59%	Moderate
Chesapeake and Ohio Canal National Historical Park	44%	Moderate

KEY FINDINGS AND RECOMMENDATIONS

Overall, the natural resources of Chesapeake and Ohio Canal National Historical Park were in moderate condition.

The vital signs framework showed that air quality condition was generally very degraded, water resources condition was variable but generally good, biological integrity condition was variable but moderate overall, and landscape dynamics condition was generally moderate.

Air Quality

Air quality was in a very degraded condition. Degraded air quality is a problem throughout the eastern United States, and while the causes of degraded air quality are largely out of the park's control, the specific implications to the habitats and species in the park are less well known. Gaining a better understanding of how reduced air quality is impacting sensitive habitats and species within the park would help prioritize management efforts.

The close connection between climate and air quality is reflected in the impacts of climate change on air pollution levels. In particular, the U.S. EPA has concluded that climate change could increase ozone concentrations and change amounts of particle pollution.

Water Resources

Water resources were in a good condition overall. No water resources metrics (apart from Benthic Index of Biotic Integrity [BIBI] and Physical Habitat Index [PHI]) were measured inside the park boundary which necessitated the use of data collected upstream of the park. It is recommended to establish regular water quality monitoring within the park boundary. Nutrients, specific conductance, BIBI, and PHI were in moderate to very degraded condition while pH, dissolved oxygen, water temperature and acid neutralizing capacity were very good, similar to results found in parks throughout the region. Specific conductance also showed a significant degrading trend. Several data gaps and research recommendations revolve around water in the park, including wetland delineation, sources of stormwater, contaminants, and sediments, and the karst geology of the park.

Many of the streams flowing through the park into the Potomac River are designated as Natural Trout Waters, Nontidal Cold Water and Public Water Supply or as Recreational Trout Waters and Public Water Supply. These streams are characterized by cold water temperatures. Water temperature increase is one of the most immediate threats from climate change, and this would result in the loss of trout from these streams.

Biological Integrity

Biological integrity was in a moderate condition overall. Deer management should continue to be a top priority. Monitoring recommendations include expanding amphibian monitoring, updating and repeating Fish Index of Biotic Integrity monitoring, and continuing to monitor pests and diseases. Forest pest

species were in a very good condition; however, emerald ash borer has been detected in the park but has not yet shown up in the regularly monitored forest plots. White-nose syndrome (WNS) is absent from the tunnels in the park, which highlights their importance to bat populations. However, WNS has been detected elsewhere in the park and due to the high mortality from this disease, management intervention is warranted. Emerald ash borer and WNS are two of the biggest threats facing the park and it is worrisome that both have recently reached the park. Data gaps and research needs include developing a bird index for non-forest species and modeling the effects of climate change and other stressors on the region's forests.

How climate change may affect the park's resources and habitats should be an ongoing research focus, in particular how it might affect the introduction and spread of exotic species and forest pests and diseases.

Landscape Dynamics

Landscape dynamics were in a moderate condition overall, with 59% attainment of reference conditions. Forest interior area was in a degraded condition both inside and adjacent to the park. This was mostly due to the linear shape of the park which limits the amount of potential forest interior area. Forest cover inside the park was in a very good condition but was in very degraded condition adjacent to the park. This relates to the proximity of the park to the Potomac River which is a non-forest land cover. Management opportunities for the park relating to these two results include maintaining and improving the quality of existing forest habitat within the park.

Impervious surface and road density within the park were both in very good condition. Impervious surface adjacent to the park was also in very good condition; however, road density at the same scale was very degraded. High road density has implications for wildlife mortality and could also result in increased surface runoff and stormwater entering the park. With development increasing near the park, it can be expected that impervious surface and road density will increase in the areas surrounding the park in the future. Management options include maintaining or increasing pervious surfaces within the park and installing stormwater retention basins.

Research needs for the park mostly relate to its function as a habitat corridor in the region. How climate change may affect the park's resources and habitats should be an ongoing research focus.

CONCLUSIONS

Natural resources in Chesapeake and Ohio Canal National Historical Park are in moderate condition overall but are under threat from surrounding land use, regionally poor air quality, overpopulation of deer, and the recent documentation of the presence of emerald ash borer and white-nose syndrome within the park. Climate change is predicted to negatively affect many of the natural resources of the park, including increasing ozone levels and particle pollution, raising the water temperature of cold-water, trout-supporting streams, changing forest composition, and affecting exotic species and forest pests and diseases.

Developed in collaboration with:



For more information, please visit the Park's Visitor Center or call (301) 739-4200.

Chesapeake and Ohio Canal
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www.nps.gov/choh

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