



STATE OF THE JAMES RIVER

2007



Background

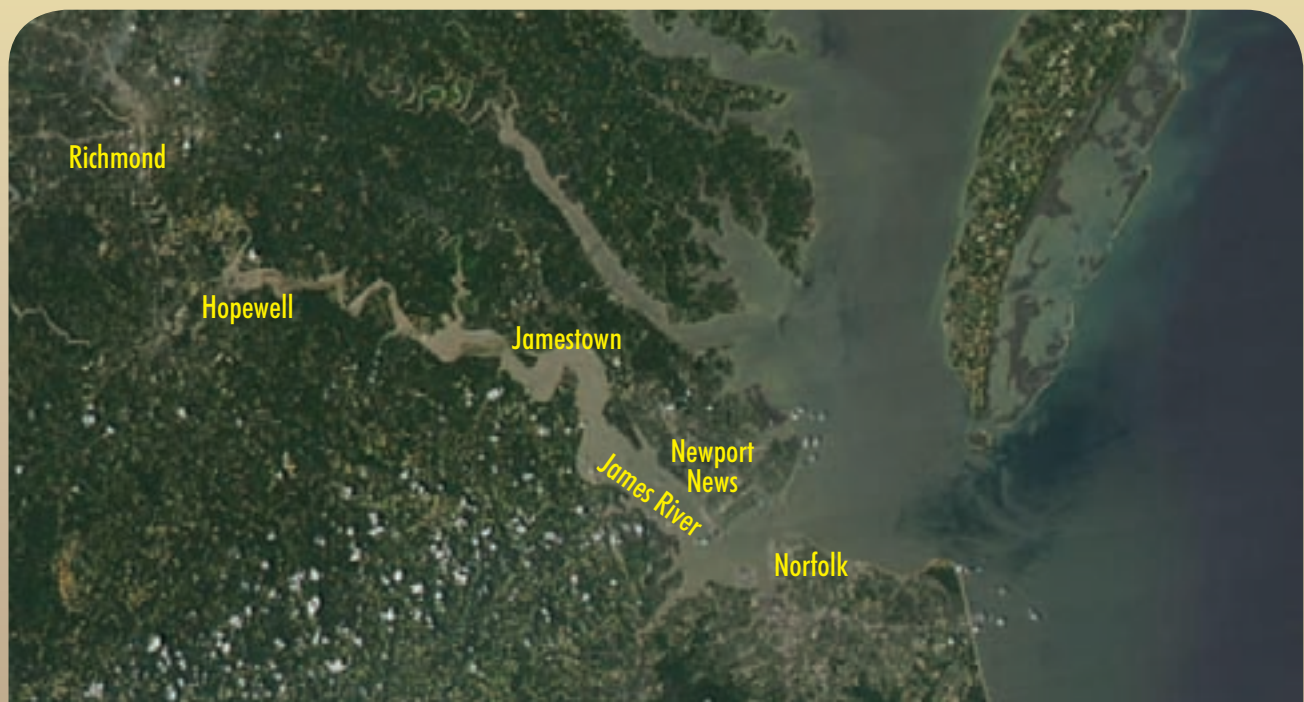
Since the founding of America on its banks 400 years ago, the James River has played a central and defining role in the development of Virginia. No other natural feature of the New World had more influence on the early colony, and no other natural feature has provided more for Virginia. After 400 years of nurturing us, America's Founding River needs nurturing itself.

This State of the James River report provides a report card on the effort to bring this shared natural resource back to full health. The report examines the status and trends of indicators in four categories that build on one another. At the top are the fish and wildlife populations that are important to the health of the river and to everyone who enjoys and cares about the river. These wildlife populations depend on habitat to provide their critical needs for life. The greatest factor affecting the quality of habitat in the James River is the amount of pollution that enters our streams and creeks and ultimately flows into the James River. Finally, the report assesses progress on the restoration and protection actions needed to reduce damaging pollution and return the James River to a healthy, diverse ecosystem.



For each indicator, JRA has identified and compiled a key measure of health. Quantitative benchmarks have been set for what we need to achieve to have a healthy James River. Current progress is compared to this benchmark to calculate a score which is averaged across the indicators in each category to determine the grade for that category.

The James River turns brown with polluted runoff after a rain storm in July 2006.



Summary

REPORT CARD

Wildlife	52% C
Habitat	53% C
Pollution	56% C+
Restoration and Protection Actions	49% C
Overall	52% C

GRADING SCALE

A	80% - 100%
B	60% - 79%
C	40% - 59%
D	20% - 39%
F	less than 20%

Half Way to a Way Healthy River

Currently, the health of the James River receives an overall grade of C with an average score of 52 percent. This means that we are about half way to the goals for returning the James River to full health.

Within the overall score is a mix of good news and bad news. While bald eagles and rockfish score 100 percent based on their remarkable population rebounds over the past several decades, shad and oysters are still at fractions of their previous levels. Likewise we have achieved strong success in reducing pollution from wastewater discharges, but we are lagging behind in sediment and erosion control.

While the James River ecosystem is complex and dynamic, there is an overriding issue that is the greatest challenge to further improvement of its health: polluted runoff-the pollution carried from the land during rain events into our streams, creeks and eventually the James River. Nearly all of the James River's fish and wildlife are affected by polluted runoff, and it is the most widespread cause of habitat degradation. Polluted runoff is the greatest source of sediment, nitrogen and phosphorus pollution that collectively cause the greatest problems throughout the river ecosystem.

No Time to Lose

The future of the James River is at a tipping point. Efforts over the past three decades have begun to reverse the river's decline and the Commonwealth of Virginia now has detailed clean up plans that specify the actions needed to restore the river to full health. However, polluted runoff from across the watershed continues to have widespread devastating impacts on the river. Moreover, at the current pace of development, Virginia will develop as much land in the next 40 years as it did in its first 400 years.

These increased pressures and demands placed on the James River threaten to undermine what progress we have made in protecting and restoring this shared treasure. Without swift and decisive action now to stem the polluted runoff entering the river, the mighty James River will once again fall into decline.

REPORT CARD

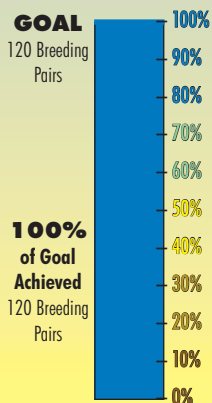
Bald Eagle	100%
Rockfish	100%
Oysters	5%
American Shad	10%
Brook Trout	45%
Average	52%

C

Fish and Wildlife



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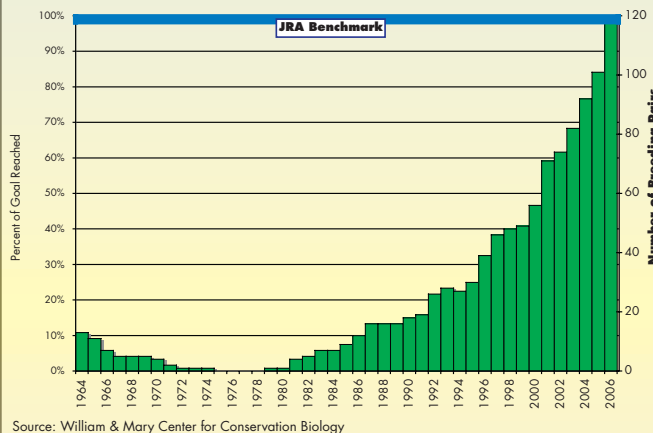


Bald Eagle - 100%

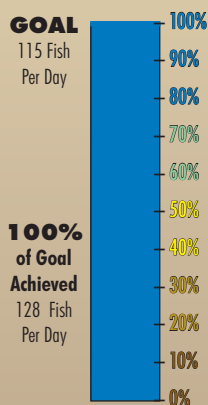
The bald eagle population is an important indicator of the health of other river birds, such as osprey and herons, that depend on the river and riparian forests along the river for its habitat. The eagle was on the brink of extinction in the middle of this century largely due to hunting and the widely-used pesticide DDT. Since the 1970's, the James River bald eagle population has made a tremendous recovery going from zero breeding pairs to 120.

JRA has set its benchmark at the current number of breeding pairs because we want to make sure that the James River eagle population remains strong and stable. Protecting critical riparian forests in the face of rapid growth and development along the James River is essential in order for our national bird to continue to thrive on America's Founding River.

Bald Eagle Population in the James River Watershed



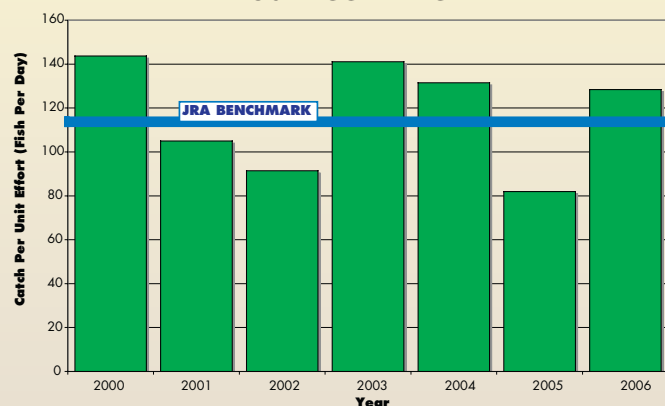
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Striped Bass - 100%

The striped bass (also known as rockfish or striper) is one of the most important commercial and recreational fisheries on the Atlantic Coast. During the late 1970's and early 1980's the population of striped bass dropped significantly. After careful management, the striped bass population was declared recovered in 1995 and has remained strong since then. Therefore, JRA has set its benchmark as the average abundance over the past seven years. However, high prevalence of infections in striped bass in the region indicates that the fish themselves are not as healthy as they should be.

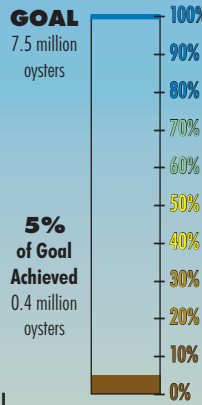
Striped Bass Abundance in James River



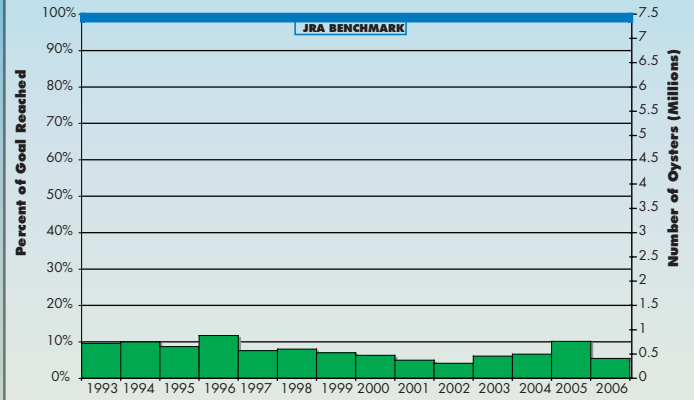


Oysters - 5%

Oysters were once so abundant that ships had to navigate around the massive oyster reefs. Oyster reefs provide critical habitat for other aquatic plants and animals, and with each adult oyster filtering 50 gallons of water per day, the oysters are an important natural filter that can help improve water quality.



Oyster Abundance in the James River



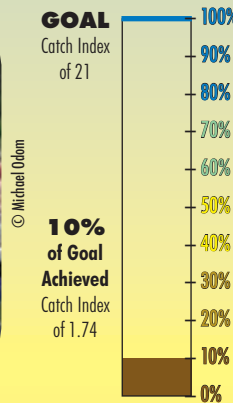
Source: Virginia Marine Resources Commission

The James River oyster population continues to struggle after a combination of over harvesting, poor water quality, and disease decimated the population over the past century. Today the James River oyster population remains at only 5 percent of the ten-fold increase from 1994 levels called for in the Chesapeake Bay 2000 Agreement.

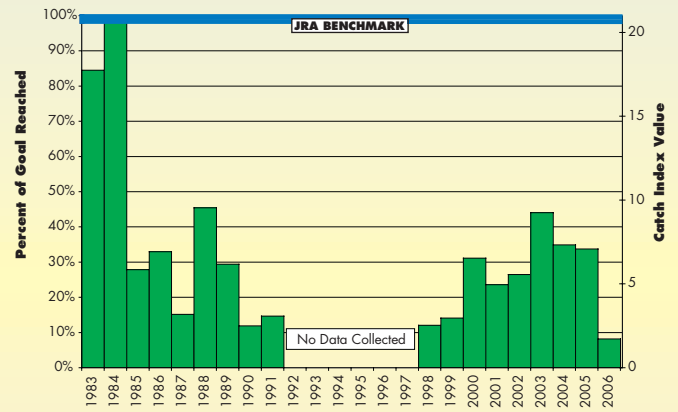


American Shad - 10%

In the late 1800's shad was the top commercial fishery in the James River. However decades of overfishing, pollution, and construction of river blockages and dams have reduced shad to a fraction of their historic levels. After stocking efforts and removal of fish blockage helped the James River shad run return, they have declined in recent years to the lowest level recorded in the last 24 years. This follows a similar concerning trend of reduced shad runs seen on numerous Atlantic Coast rivers. American shad in the James River are only 10% of the modern day high recorded in 1984.



American Shad Abundance on James River

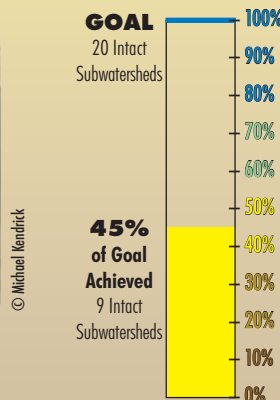


Source: Virginia Institute of Marine



Brook Trout - 45%

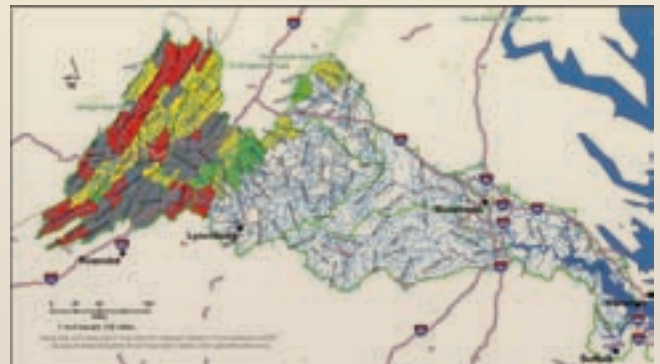
Brook trout are the only native trout species to Virginia and their sensitivity to changes in water quality and temperature make it an important indicator of aquatic health of the James River. Brook trout are now completely gone from 30 out of 100 streams in the James River basin where they have historically thrived. Viable populations remain in only nine percent of their historic range in the James River basin.



Brook Trout Population in the James River Watershed

Subwatershed Categories (Total #)

- Intact: >90% Habitat Occupied (9)
- Reduced: 50-90% Habitat Occupied (38)
- Critically Reduced: <50% Habitat Occupied (25)
- Extirpated (30)
- Never Occurred (50)



Source: Eastern Brook Trout Joint Venture

Restoring this species' habitat will require protecting forested watersheds, replanting streamside forests, and reducing polluted runoff from agriculture and development. In order to achieve goals set by the Eastern Brook Trout Joint Venture, viable populations must be restored to 20 stream systems, or subwatersheds, and populations improved in another 11 systems.

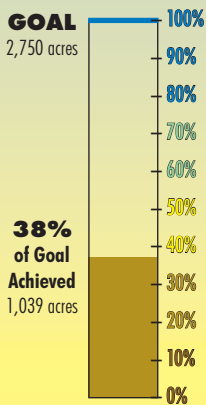
REPORT CARD

Underwater Grasses	38%
Riparian Forests	73%
Stream Condition	53%
Tidal Water Quality	48%
Average	C 53%

Habitat



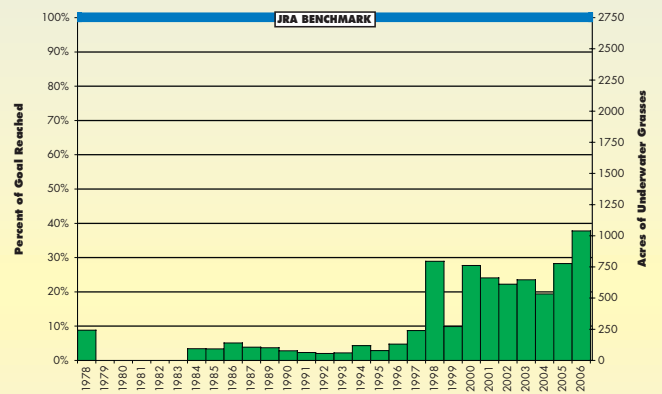
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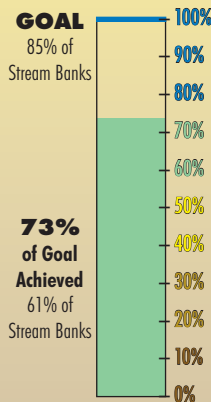
Underwater Grasses - 38%

Underwater grasses (also known as Submerged Aquatic Vegetation) provide critical habitat for juvenile fish, crabs and waterfowl. JRA's goal is to restore the 2,750 acres of underwater grasses that once blanketed the James River and its tributaries. In 2006, James River underwater grasses rose to their highest level in recent decades with a total of 1,039 acres, a 25 percent increase over 2005. Underwater grasses are now flourishing in the Chickahominy River and in Herring, Flowerdew Hundred, Tomahund, Wards and Upper Chippokes Creeks. Underwater grasses can also be found above the falls. However, there are still no underwater grass beds mapped anywhere on the main stem of the James River from Richmond to the James River Bridge in Newport News.

Underwater Grass Abundance



Source: Virginia Institute of Marine Science

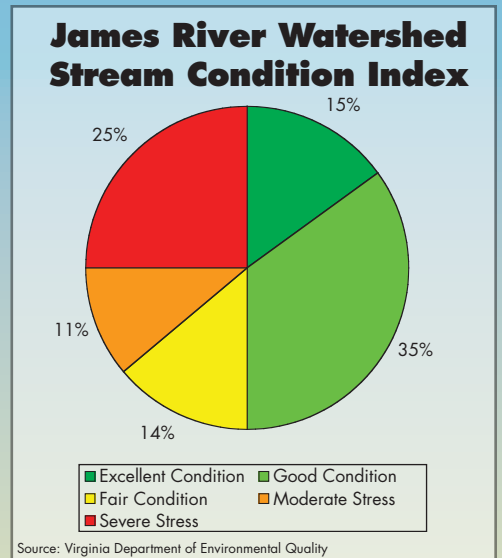
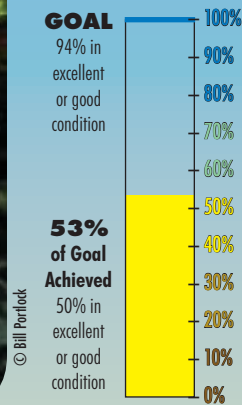


Riparian Forests - 73%

When John Smith explored the James River and Chesapeake Bay from 1607 to 1609, he remarked that forests were seen in all but a few areas along the water. These riparian forests provide important habitat for wildlife, filter pollution from runoff and protect stream banks from erosion. Riparian forests are threatened by waterfront development and sometimes agriculture and forestry. However, efforts are being made by many sectors to protect and restore these vital elements of river health.

The most recent available survey of the James River found forests along 61 percent of the banks of the James River and its tributaries. Implementing Virginia's protection and restoration goals for riparian forests would return forests to 85 percent of the stream banks and river banks of the James River basin, making the current extent of riparian forest 73 percent of the goal.

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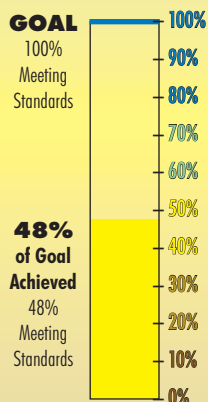


Stream Condition - 53%

The James River has over 12,000 miles of streams that flow into it. The overall health of the river largely depends on the health of the streams flowing into it. These local streams are important resources for the communities through which they flow.

Fifty percent of the James River's streams are considered to be in good or excellent condition, which is more than the state average of 30 percent. However, over one-third of the James River's streams are under moderate or severe stress. With 94 percent of the watershed in forests and farmland, which with proper management should be able to maintain healthy stream conditions even with future development, JRA has set a benchmark of having 94 percent of the streams be in good or excellent condition.

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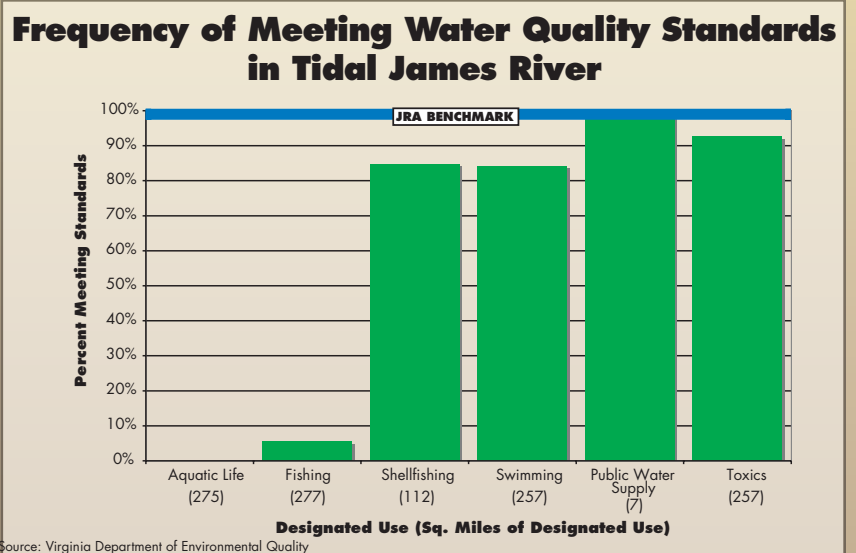
Tidal Water Quality - 48%

The greatest threat to the health of the tidal James River and to human activities on the river is degraded water quality. Water quality is important to fishing, swimming, shellfish harvesting, drinking water, aquatic life and other wildlife. Virginia has established regulatory water quality standards needed to support all of these uses of the river. JRA set its benchmark at full compliance with all tidal water quality standards.

On average, the tidal James River meets water quality standards in 48 percent of the areas monitored for the various uses. Where the James River is used for drinking water, compliance with the associated water quality standards was 100 percent. Areas monitored for shellfish harvesting, swimming and toxics had over 80 percent compliance. None of the tidal James River fully met the standards for supporting healthy aquatic life and 95 percent of the tidal James River has health advisories for fish consumption.



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REPORT CARD

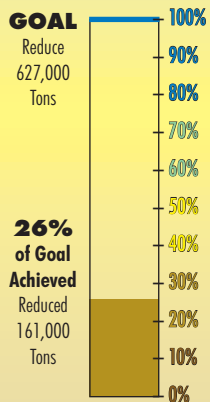
Sediment	26%
Phosphorus	93%
Nitrogen	49%
Average	56%

C+

Pollution

The primary cause of the James River's unbalanced ecosystem can be seen after any major rain event as plumes of brown, pollution-laden runoff engulf its waterways. This polluted runoff is the biggest killer in the James River from the river's headwaters to its mouth as it clouds the water and buries critical habitat. Polluted runoff carries a toxic mix of bacteria, sediment, heavy metals, phosphorus, and pesticides that causes varied and widespread human health and ecological problems. In addition to polluted runoff, pollution also comes from sewage treatment plants and industrial discharges.

The most widespread forms of pollution affecting the James River are sediment, nitrogen and phosphorus. Virginia has established numerical goals in its tributary strategies for the total amount of sediment, nitrogen and phosphorus that the river can receive on an average basis and still have a healthy river ecosystem. JRA uses these goals to set its benchmark and tracks progress toward them with a rolling 10-year average of annual sediment, nitrogen and phosphorus pollution entering the river.



Sediment Pollution Reduction - 26%

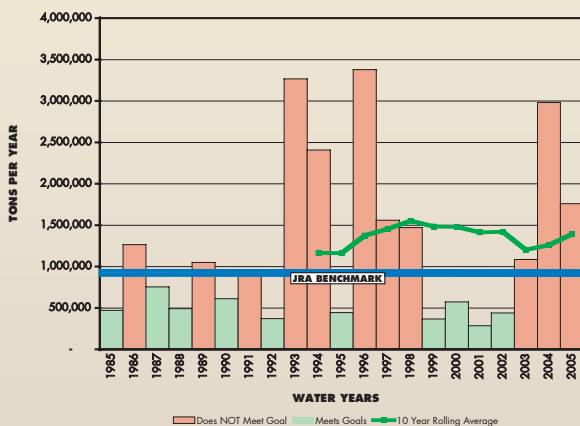
Sediment pollution stems directly from the amount of land disturbance within the river's 10,000-square mile watershed. Major sources include barren construction sites and plowed farm fields. Large amounts of sediment pollution also are caused by developed areas where hardened, impervious surfaces, such as parking lots, roads and rooftops, increase the volume and velocity of storm water runoff overwhelming local streams and creeks and causing stream bank erosion.

Thus far, we have achieved 26 percent of the needed sediment pollution reductions. Although annual sediment loads during drought years have been lower than the goal, we still have too much erosion and sedimentation occurring during wet and normal years.

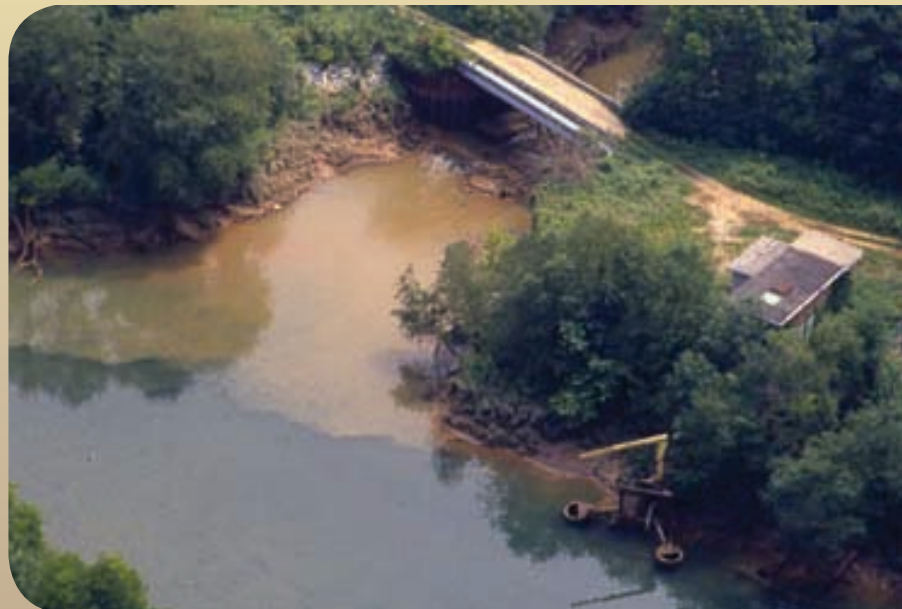


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Sediment Pollution in James River

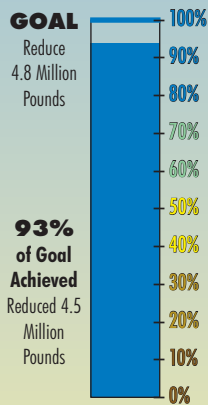


Source: USGS and EPA Chesapeake Bay Program



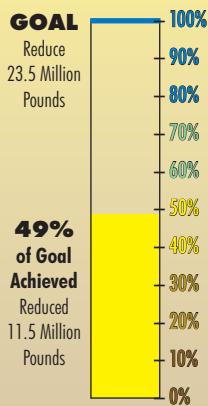
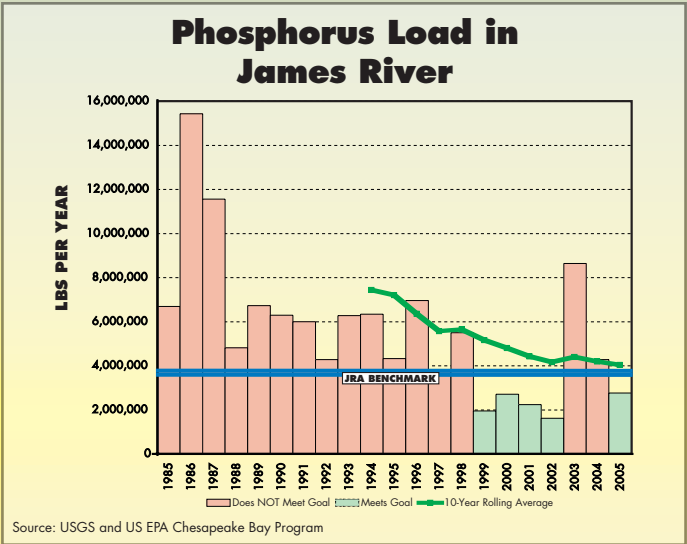
Nitrogen and Phosphorus Pollution

Excessive nitrogen and phosphorus pollution from sewage, manure, fertilizer and air pollution, fuel algae growth that blocks sunlight from vital underwater grasses and displaces healthy plankton that are critical food for fish and other aquatic life. Some types of algae can also become toxic to aquatic life and even to humans. As algae outbreaks die and decompose they can create "dead zones" where little oxygen is available to support aquatic life.



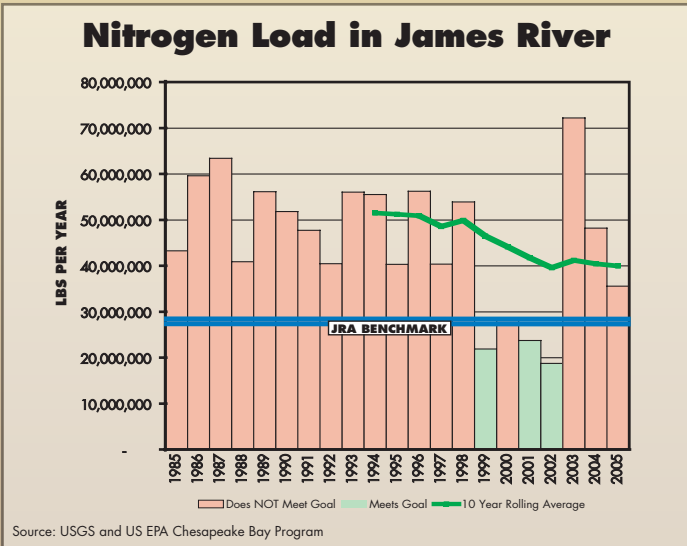
Phosphorus Pollution Reductions - 93%

Over the past twenty years, we have achieved 93 percent of the needed phosphorus pollution reductions. Much of this was accomplished through the phosphate detergent ban in the 1980's, wastewater treatment upgrades and improved agricultural practices. However, during wet years with high amounts of runoff, we can still exceed the levels of phosphorus pollution needed to maintain a healthy James River.



Nitrogen Pollution Reduction - 49%

We have achieved 49 percent of the needed nitrogen pollution reductions to restore a balanced and healthy James River. Like phosphorus pollution, most of these reductions were achieved through waste water treatment upgrades. Additional upgrades will be necessary to meet the goal, but greater reductions must also be made in reducing nitrogen pollution from agriculture and development.



REPORT CARD

Waste Water Treatment 90%

Agriculture

Conservation Tillage 89%

Winter Cover Crops 43%

Farm Nutrient Management 43%

Stream Protection 18%

Development

Low Impact Development 42%

Sediment & Erosion Control 25%

Urban Nutrient Management 5%

Natural Area Conservation

Riparian Buffer Restoration 41%

Land Conservation 93%

Average *C* 49%

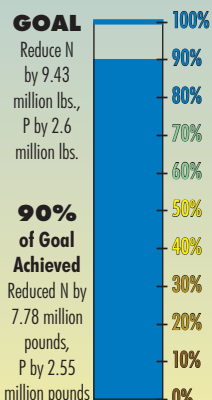
River Protection and Restoration Actions

While there are many actions that individuals, businesses and governments may take to reduce pollution, below are the top priority protection and restoration actions needed to restore the James River to full health.

Wastewater Treatment Pollution Reduction - 90%

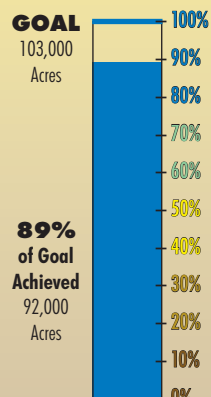
Over the past twenty years, major investments have been made to upgrade wastewater treatment at sewage treatment plants and industrial facilities. To date James River wastewater treatment plants have achieved 90 percent of the reductions needed to meet the nitrogen (N) and phosphorus (P) goals for wastewater. Additional upgrades will be necessary to fully meet the goals and to accommodate future growth.

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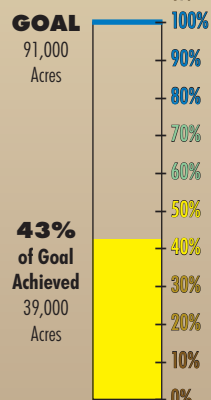
AGRICULTURE:

Because of the extensive land area used for cropland and pasture, agriculture can be a major part of the solution to a healthier James River. Below are some of the priority conservation practices that farmers can implement to reduce polluted runoff. JRA has adopted goals for each practice set by the Commonwealth of Virginia as part of the overall Chesapeake Bay clean up efforts.



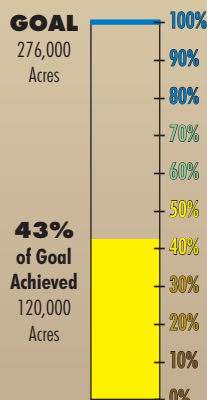
Conservation Tillage - 89%

By switching to tillage methods that leave the soil intact rather than plowing it up, farmers can reduce erosion and improve soil condition. Farmers in the James River watershed have implemented conservation tillage techniques on an estimated 92,000 acres of a total goal of 103,000 acres.



Winter Cover Crops - 43%

In 2005, farmers in the James River watershed signed up to plant 39,000 acres of winter cover crops to help prevent erosion and hold excess fertilizer on fields during the winter. The goal for the James River watershed is 91,000 acres annually.

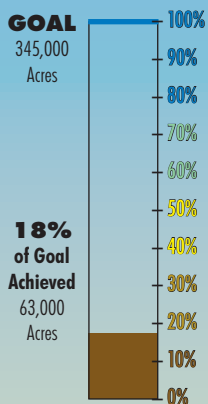


Farm Nutrient Management - 43%

Nutrient management plans guide farmers in efficiently applying fertilizers to reduce runoff of nitrogen and phosphorus. Nutrient management plans are currently written for 120,000 acres of a targeted 276,000 acres of agricultural lands in the James River watershed.

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Stream Protection – 18%

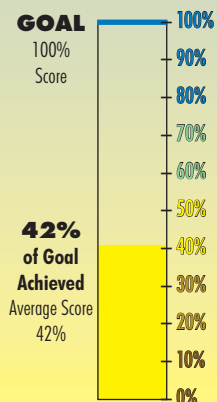
Protecting streams from livestock by such means as fencing out cattle reduces stream bank erosion and helps filter bacteria, nitrogen and phosphorus pollution from runoff. Of the total 345,000 acres of streamside pasture targeted for protection, 63,000 acres have been implemented.

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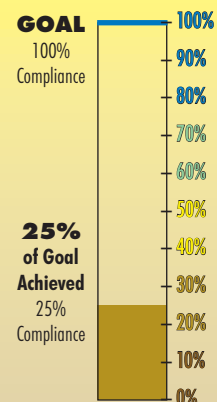
DEVELOPMENT:

Because of the drastic disturbances that development imposes on the land, great care must be taken both during and after construction to protect water quality.



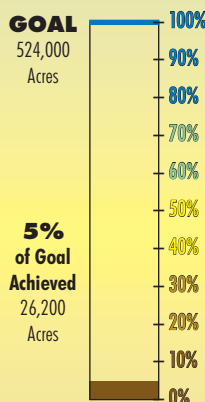
Low Impact Development Policies – 42%

Local development policies are the greatest factor determining how development is implemented, and they can either encourage or prevent environmentally sensitive development techniques. In an assessment conducted by JRA of how well localities in the James River watershed encourage low impact development, the average score of all 45 counties and cities assessed was 42 percent.



Sediment and Erosion Control Compliance – 25%

The greatest risk of erosion and sedimentation for streams is during the land clearing and construction process. Virginia requires safeguards during construction to prevent erosion and control stormwater runoff. However, local compliance with erosion and sediment control requirements is currently about 25 percent.



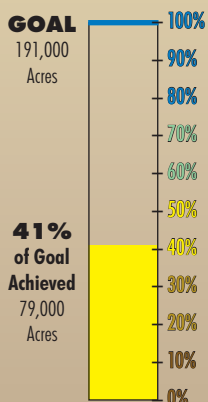
Urban Nutrient Management – 5%

An estimated 40 percent of commercial fertilizer sold in Virginia is applied to golf courses, institutional properties, residential lawns and other urban lands. Only 5% of the targeted 524,000 urban acres have a nutrient management plan to guide proper fertilizer application rates and timing.

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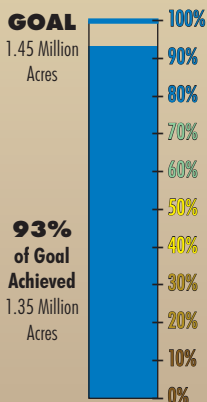


NATURAL AREA CONSERVATION:



Riparian Buffer Restoration – 41%

Riparian buffers are one of the most cost effective approaches to reducing polluted runoff and provide important wildlife habitat at the same time. To date, 41 percent of the 191,000-acre goal for restoring riparian buffers in the James River watershed has been completed.



Land Conservation – 93%

Approximately 20 percent of the James River watershed was been protected from development through public land ownership or conservation easements. To reach 100% of the land conservation goal, an additional 100,000 acres must be protected.



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P.O. Box 909
Mechanicsville, VA 23111
(804) 730-2898
www.jamesriverassociation.org

About James River Association

The James River Association (JRA) is a non-profit organization solely dedicated to the protection and restoration of the James River. The mission of JRA is to provide a voice for the River and take action to promote conservation and responsible stewardship of its natural resources. Founded in 1976, JRA is the oldest river conservation organization in Virginia and works through its four core programs - River Advocacy, James RiverKeeper®, Education and Outreach and Watershed Restoration - to ensure a healthy James River ecosystem for current and future generations. Please visit our website at www.jamesriverassociation.org for more information about JRA, the State of the James River report and how you can help protect America's Founding River.

Acknowledgements

Funding for the State of the James River report was provided by The Dominion Foundation and the Beirne Carter Foundation. The James River Association would like to thank the following organizations for their contributions to the report: VCU Rice Center, William and Mary Center for Conservation Biology, Virginia Institute for Marine Science, Virginia Marine Resources Commission, Trout Unlimited, U.S. Forest Service, U.S. Geological Survey, U.S. Environmental Protection Agency, Chesapeake Bay Program, Virginia Department of Conservation and Recreation, Virginia Department of Game and Inland Fisheries, Virginia Department of Environmental Quality. A special thank you goes to Tish Tablan for her hours of research and writing for the report.

The James River Watershed

