Chesapeake Bay Program | Indicator Analysis and Methods Document
Protected Lands | Updated September 2025

Indicator Title: Protected Lands

Relevant Outcome(s): Protected Lands

Relevant Goal(s): Land Conservation

Location within Framework (i.e., Influencing Factor, Output or Performance): Performance

A. Data Set and Source

1) Describe the data set. What parameters are measured? What parameters are obtained by calculation? For what purpose(s) are the data used?

   The data set records the number of acres of permanently protected lands in the Chesapeake Bay watershed and tracks progress towards the Protected Lands Workgroup goal of protecting an additional 2 million acres by 2025. This goal is not just a numerical target but a reflection of our collective commitment to preserving the unique and diverse ecosystems of the Chesapeake Bay region for future generations.

   As currently defined by the Chesapeake Bay Program, "protected lands" are understood as lands permanently protected from development, whether by purchase or donation, through a perpetual conservation or open space easement or fee ownership for their cultural, historical, ecological, or agricultural value. This definition includes non-traditional conservation mechanisms, including transfer of development rights, programs that require a conservation easement for the "sending" property, and purchase of development rights programs. Lands protected through easements and the purchase of development rights typically remain private.

   Protected lands include acres protected through federal, state, county, municipal, township, and tribal ownership; open space and recreational land; publicly owned forests, wildlife management areas, natural areas, habitat areas, and wetlands; privately owned working farms or forests with conservation easements; historically significant lands, such as protected battlefields, colonial towns, and farms, parks, and recreational areas.

   Only authoritative data sources (primary and most reliable) are used to compile this dataset. The protected lands indicator (PLI) dataset was created through a data call effort from the Protected Lands Workgroup and relevant practitioners who provided geospatial data directly. The Workgroup played a crucial role in coordinating the data collection efforts and ensuring the accuracy and completeness of the dataset.

Data sources include:
PADUS 4.1 U.S. Geological Survey (USGS) Gap Analysis Project (GAP), 2024, Protected Areas Database of the United States (PAD-US) 4.1: U.S. Geological Survey data release, https://www.sciencebase.gov/catalog/item/652d4fc5d34e44db0e2ee45e.

Washington, District of Columbia Datasets (as of 5/12/2023, unchanged since the last iteration of the indicator-- 2022)

- DC Parks
- DC National Parks
- National Park Service, National Capital Region (parcels provided via email)
  **NPS recently updated its geospatial data to reflect ownership instead of designation and proclamation areas.*

Delaware Datasets (as of Feb/2025)

- Delaware Protected Lands

Maryland Datasets (as of July/2025)

- DNR-Owned Properties and Conservation Easements
- Forest Conservation Act Easement
- MD Environmental Trust Easements
- MD Agricultural Land Preservation Foundation Easements
- Rural Legacy Properties
- Transfer Development Rights and Purchase Development Rights
- Local Protected Lands
- Private Conservation Lands

New York Datasets (as of Feb/2025)

- New York Protected Areas
- New York Protected Areas Easement

Pennsylvania Datasets (as of Feb/2025)

- PAConservedLands_PASDA_merge_250604
- ACE_W_ND_CBW – Restricted
- CE_W_ND_CBW – Restricted

Virginia Datasets (as of Feb/2025)

- ChesapeakeBayProtLands.gdb

West Virginia Datasets (As of Feb/2025)

- WVDNT_CBP_2025

The initial source for our data included the Protected Areas Database of the United States (PAD_US—Version 4.1), which is “America's official national inventory of U.S. terrestrial and marine protected areas…” PAD US was used to augment the data provided from the jurisdictions and serves as the authoritative dataset for all federally owned lands. PAD US also includes data from the former National Conservation Easement Database, a public-private partnership compiling easement data from land trusts and public agencies.

Once compiled, these datasets were put in PAD US format when appropriate and merged into the new 2024 dataset. THE PAD US format includes information on category, local owner, management type, management name, and public access status.

The acreage calculations used for determining the progress toward the goal are based on the Geographic Information System (GIS) area using the provided polygons, converting those polygons to 5-meter raster grid cells, and converting them to acres. Hypothetically, a locally owned park in Virginia may have a reported value of 671 acres in the attribute field; after converting to a 5X5 square meter raster grid cell, this area has 1,085,608 cells. A 5X5 meter cell is the equivalent of 25 square meters. Multiplying the total cell count by 25 gives a value in square meters. 108,658 cells*25 = 2,716,450 square meters. Lastly, dividing by 4046.86 converts sq. meters to acres (2,716,450 square meters/4046.86) = 671 acres. This procedure was completed by ownership type and aggregated watershed-wide at the state scale.

2) List the source(s) of the data set, the custodian of the source data, and the relevant contact at the Chesapeake Bay Program.
   - Source: See above description for sources and compilation process.
   - Geographic Information System Custodian: Coral Howe, Geospatial Data Analyst, USGS, chowe@usgs.gov
   - Chesapeake Bay Program Contacts: Sophie Waterman, Geographer/Protected Lands Workgroup Coordinator, USGS, Chesapeake Bay Program Office, swaterman@chesapeakebay.net

3) Please provide a link to the location of the data set. Are metadata, data-dictionaries and embedded definitions included?
   https://gis.chesapeakebay.net/portal/home/item.html?id=f085c33e0fa64879829ed57027998ce1

B. Temporal Considerations

4) Data collection date(s): 2024 (compiled January - July 2025).

5) Planned update frequency (e.g., annual, biannual, etc.): It has been developed every two years, but it will depend on the Protected Lands Workgroup decision for future updates.

   Source Data: This is the last iteration of the Protected Lands indicator using this methodology. We hope efforts in the future will concentrate in populating the “Date of Establishment” attribute and data improvements, depending on final language of the “Beyond 2025” Chesapeake Bay Watershed Agreement. We will work with the community of practice to refine current methods.

6) Date (month and year) next data set is expected to be available for reporting: The next Protected Lands data will be released in 2027.

C. Spatial Considerations

7) What is the ideal level of spatial aggregation (e.g., watershed-wide, river basin, state, county, hydrologic unit code)?

   Generally, the data is at a 1:24,000 scale. Spatial aggregation is acceptable at any scale, and tools have been developed to facilitate this type of analysis. The use of raster-based data is recommended for any analysis.

8) Is there geographic (GIS) data associated with this data set? If so, indicate its format (e.g., point, line polygon).

   Polygon. This polygon data may contain duplicate records and overlapping parcels and is not recommended for acreage calculation. However, a 5-meter raster grid with ownership is also available and strongly recommended for acreage calculations; see Coral Howe (chowe@usgs.gov) for instructions. It is essential to know that the indicator numbers are calculated by the state to avoid distortions of the dataset due to projections. The 5-meter raster dataset covering the Chesapeake watershed will have a different count of values (and thus areas) than the individual state data combined, due to the projection used based on its extent.

9) Are there geographic areas that are missing data? If so, list the areas.

   Some specific types of data, such as land use records, conservation easement boundaries, and biodiversity surveys, from smaller counties and local governments, as well as smaller land trusts and conservation easement data, may be missing due to factors such as limited resources, lack of standardized data collection methods, and varying levels of data transparency.

   Additionally, some agricultural easements funded in whole or partly by Natural Resource Conservation funds may be underrepresented in this dataset. Furthermore, open space roadside areas may be missing. The absence of these data points could lead to inaccurate assessments of conservation efforts and hinder effective planning. It's important to note that the exact magnitude of these gaps in acreage is currently unknown, underscoring the need for continued data refinement.

   The iterative process and request for information with the jurisdictions ensure we have the best data available for the indicator. This is not a solitary effort, but a collaborative one, where we work closely with the jurisdictions to gather the most accurate data. Importantly, this is an ongoing process, and improvements and refinements of the

datasets in each jurisdiction are continuously being made. Please refer to Appendices A-C for details on changes and known issues with the current indicator.

10) Please submit any appropriate examples of how this information has been mapped or otherwise portrayed geographically in the past.
https://www.chesapeakeprogress.com/conserved-lands/protected-lands

D. Communicating the Data

11) What is the target or threshold measured by this indicator? How was it established?

Based on the 2014 Chesapeake Bay Watershed Agreement, the goal for protected lands is that by 2025, partners will protect an additional two million acres (in addition to the number of acres protected since the baseline of 2010) of lands throughout the watershed—currently identified as high-conservation priorities at the federal, state, or local level—including 225,000 acres of wetlands and 695,000 acres of forest land of highest value for maintaining water quality. This is consistent with the similarly worded goal in the "Strategy for Protecting and Restoring the Chesapeake Bay Watershed."

12) What is the status in relation to the target established in the outcome? Why? Would you define our outlook[1] toward achieving the outcome as on course, off course, uncertain, or completed? Upon what basis are you forecasting the outlook?

In 2024, 1,801,943 acres of land were protected in the Chesapeake Bay watershed. This number falls short of the 2-million-acre goal in the outcome; therefore, the outcome is off course to be met by the end of 2025. However, this number represents about 90 percent of the goal. Once improvements in the date of establishment are completed, we will be able to assess whether this goal was officially met. In the meantime, a 90 percent increase in protected lands represents a significant milestone in land protection and a great step towards safeguarding important landscapes for future generations. This progress also sets a hopeful tone for future success.

Currently, about 23% of the Chesapeake Bay watershed, a critical ecosystem, is under protection. This figure, while not meeting the initial goal, is a significant step towards our conservation objectives.

13) Has a new target, threshold or outcome been established since the last reporting period? Why? No.

14) Has the methodology of data collection or analysis changed since the last reporting period? How? Why?

The methodology has not changed. The production of the 2024 PLI is consistent with previous years' efforts. We continue to iterate on the process, aiming at automating the

indicator. Still, the automation efforts won't be entirely successful until jurisdictions adhere to a specific data schema that is universal to all the jurisdictions or consistent throughout data calls. For this iteration, we have omitted the use of the previous indicator to enhance state provided data.

15) What is the long-term data trend (since the start of data collection)?

A total of 9,276,754 acres of land is permanently protected in the Chesapeake Bay watershed. The data, when compared with previous indicators, suggests a positive trend of increasing protected lands. However, the lack of comprehensive data on the date of establishment hinders our ability to assess the trends and rates of protection accurately. Some jurisdictions are still refining their data to reflect permanent protections, which may lead to a temporary decrease in land protection. It's crucial that we continue to work on these data refinements and corrections to ensure the most accurate representation of land protection.

16) What change(s) does the most recent data show compared to the last reporting period? To what do you attribute the change? Would you characterize that change in the recent progress[2] as an increase, decrease, no change, or completed for this outcome?

The following are observed changes from the last reporting period:

- Delaware has increased its protected lands by 4,926 acres, representing a 3.9% increase in cumulative protected lands.
- In the District of Columbia, 333 acres in protected lands decreased due to refinements in ownership boundaries from the National Park Service (NPS), which aimed to reflect actual land ownership accurately.
- Maryland experienced a significant decrease of 20,795 acres in its protected lands. This reduction was identified after comparing previous indicators, revealing some missing local properties, reservoirs, and lakes. We manually added the reservoirs and lakes; however, updates to the Maryland iMAP map services were not completed when the indicator was finalized.
- New York also saw a reduction in protected lands by 24,277 acres. These changes are likely due to data corrections. Unfortunately, a formal data review was not conducted due to staffing changes, highlighting the challenges in maintaining accurate information.
- Pennsylvania increased its protected lands by 42,887 acres, primarily through local and private land ownership.
- Virginia had the most substantial increase, adding 217,096 acres of protected lands, mainly from federal, local, and private ownership.
- West Virginia decreased its land protection by about 52,029 acres. These changes are presumed to be boundary corrections and other data adjustments. Many local lands appeared missing in the state-provided data, highlighting the value of the PADUS 4.1 data that we used to supplement the state-provided

data. We also included data from the National Conservation Easements, now only available through PAD US.

As discussed previously, the percentage of protected lands is increasing, but we do not have enough data to estimate the rate of protection or trends. Please refer to Appendix A for a list of known challenges and opportunities to improve the indicator in the future.

17) What is the key story told by this indicator?

The population in the Chesapeake Bay watershed is not just growing, it's growing rapidly. With the population within the watershed projected to exceed 20 million by 2040, the need for proactive measures is more pressing than ever.

The supporting development and land conversion that this growth implies rank among the top stressors to the Bay's ecosystem and are a significant threat to its restoration and protection. Strategies to combat this top stressor and others include strategizing land use planning and accounting for population growth, positive changes in land use and land conservation policy, increasing funding and staffing capacity for agencies and jurisdictions, encouraging robust and collaborative partnerships, providing technical assistance programs, aligning land conservation priorities with funding opportunities, expanding incentives for agencies and organizations, and advancing stewardship for future conservation and protection.

As a beacon of hope, this indicator reports the increasing acres of permanently protected lands within the Chesapeake Bay watershed, a testament to the positive impact of our collective efforts.

Jurisdictions are increasing their permanently protected lands in accordance with the 2014 Chesapeake Bay Watershed agreement. There may be a need to sustain and/ or increase the rate at which lands are protected to meet the established goal. Still, protection rates are difficult to gauge because state or other protected lands databases have not consistently included the date of protection (aka "date established") for each parcel, and thus only present a snapshot average. However, overall, the data suggest that the number of protected lands is increasing.

E. Adaptive Management

18) What factors influence progress toward the goal, target, threshold or expected outcome?

Many factors can influence the rate of jurisdictions in protecting lands. Population growth, growth in impervious surfaces, and public support are among them. Because of the opportunistic nature of land conservation, fluctuations in funding for land acquisitions, and the trends of land conservation from the past decade, variation

between the numbers of additional acres permanently protected each year is anticipated.

Management and leveraging of diverse funding pools, integration and coordination of conservation data, and the capacity level of conservation land trusts also influence progress towards this outcome. The associated Management Strategy for this Outcome discusses these and other factors in more detail.

Population growth and development have increased the need to preserve natural places such as forests, parks, and other permanently protected lands, which provide habitat for animals and filter pollution before it reaches the Bay and its tributaries. They also allow for the preservation of the cultural, historic, recreational, and working lands that have informed the unique heritage and identity of people living in the Chesapeake region for centuries.

Conserving important places relies heavily on public support. Reporting on the status of land protection within the Bay watershed can help generate that support and provides transparency related to these efforts. In addition to providing an important public update, reporting on this indicator directly shows progress towards achieving the Strategy for Protecting and Restoring the Chesapeake Bay Watershed (issued under Executive Order 13508) outcome to "protect an additional two million acres of lands throughout the watershed currently identified as high conservation priorities at the federal, state or local level by 2025, including 695,000 acres of forest land of highest value for maintaining water quality."

19) What are the current gaps in existing management efforts?

The associated Management Strategy for this Outcome details current efforts and gaps in the following areas:

- Improving the Quality, Quantity and Accessibility of Conservation Priority Data
- Aligning Land Conservation Priorities with Funding Opportunities.
- Building the Land Conservation Community
- Developing the Capacity and Tools for Restoring, Protecting and Managing Landscapes
- Expanding Federal, State and Local Funding and Incentives for Conservation
- Increasing Public Support for Land Conservation and address any possible tax burdens that could hinder restoration
- Advancing Youth Engagement and Citizen Stewardship

In addition, jurisdictions and partners need sufficient funding and capacity to implement PAD US standards as well as aggregate progress into a single dataset for their state.

20) What are the current overlaps in existing management efforts?

This effort is highly collaborative across the Watershed through the Chesapeake Conservation Partnership (CCP) and cascading down to the federal agencies, states, local governments and the multitude of land trusts and other non-profits. While this multi-layered effort can always be improved, there are no significant overlaps.

21) According to the management strategy written for the outcome associated with this indicator, how will we (a) assess our performance in making progress toward the goal, target, threshold or expected outcome, and (b) ensure the adaptive management of our work?

Monitoring progress on items detailed in biennial work plans will provide insight into what the land protection data tells us about past and future land protection efforts. Other measurement and assessment tools that can also inform progress include:

- An annual progress report for the public articulating best practices and leveraging successes.
- Partner and public surveys to measure changes in awareness, constituency building and support of land conservation.
- Tracking of public and private funding for land conservation to monitor changes in funding levels over time.

Annual Chesapeake Conservation Partnership gatherings provide a venue for reviewing progress towards this goal, sharing drivers for and obstacles to conservation, and assessing and addressing changes in management direction. The Steering Committee's regular meetings enable progress to be adapted as needed. Regular communications, workgroup meetings, and annual reporting will also provide additional information and opportunities for adaptive management.

F. Analysis and Interpretation

Please provide appropriate references and location(s) of documentation if hard to find.

22) What method is used to transform raw data into the information presented in this indicator? Please cite methods and/or modeling programs. N/A

23) Is the method used to transform raw data into the information presented in this indicator accepted as scientifically sound? If not, what are its limitations? N/A

24) How well does the indicator represent the environmental condition being assessed? Please refer to answers in questions 9,12, and 16 of this document.

25) Are there established reference points, thresholds, ranges, or values for this indicator that unambiguously reflect the desired state of the environment? N/A

26) How far can the data be extrapolated? Have appropriate statistical methods been used to generalize or portray data beyond the time or spatial locations where measurements were made (e.g., statistical survey inference, no generalization is possible)? N/A

G. Quality

Please provide appropriate references and location(s) of documentation if hard to find.

27) Were the data collected and processed according to a U.S. Environmental Protection Agency-approved Quality Assurance Project Plan? If so, please provide a link to the QAPP and indicate when the plan was last reviewed and approved. **If not, please complete questions 28-31.** No.

28) *If applicable:* Are the sampling, analytical and data processing procedures accepted as scientifically and technically valid? Yes.

29) *If applicable:* What documentation describes the sampling and analytical procedures used?

This document. For additional technical details please refer to the metadata file or contact Coral Howe (chowe@usgs.gov).

30) *If applicable:* To what extent are procedures for quality assurance and quality control of the data documented and accessible?

There is a need to standardize the quality assessment and control process. Please refer to questions 12, 16 and Appendix A for descriptions on limitations of interpreting the dataset.

31) Are descriptions of the study design clear, complete and sufficient to enable the study to be reproduced? N/A

32) Was the sampling, analytical and data processing procedures performed consistently throughout the data record? See Appendix B.

33) If data sets from two or more sources have been merged, are the sampling designs, methods and results comparable? If not, what are the limitations?

Please refer to Appendix B for details on tracking protected lands. A python script developed by the Chesapeake Conservancy was used to streamline the process of assimilating the source datasets into the indicator. For challenges and limitations, please refer to questions 12, and 16 and Appendix A in this document.

34) Are levels of uncertainty available for the indicator and/or the underlying data set? If so, do the uncertainty and variability impact the conclusions drawn from the data or the utility of the indicator?

No levels of uncertainty are available for the indicator. There is a need to standardize the quality assessment and control process. Please refer to questions 12, 16 and Appendix A for descriptions on limitations of interpreting the dataset.

35) For chemical data reporting: How are data below the MDL reported (i.e., reported as 0, censored, or as < MDL)? If parameter substitutions are made (e.g., using orthophosphate instead of total phosphorus), how is data normalized? How does this impact the indicator? N/A

36) Are there noteworthy limitations or gaps in the data record?

Yes, there is the need to have a date of establishment attribute completed to assess rate of conservation and trends. Refer to questions 12, 16 and Appendix A for information on limitations of the dataset.

H. Additional Information (*Optional)*

37) Please provide any further information you believe is necessary to aid in communication and prevent any potential misrepresentation of this indicator.

Appendix A: Known Challenges to be Addressed in the Future

- Lack of standardization among data providers. For the 2024 iteration, most jurisdictions provided data in PAD US, or PAD US-like schema. There is still a need for consistency either by jurisdiction or a unified schema.
- Lack of data completeness, including date of establishment.
- Topology issues with matching different geospatial datasets. The degree of overlap and other topology issues is unknown, but we are aware of geometry issues in some shapefiles that have not addressed.
- No confidence interval or accuracy is provided, and Quality Assurance and Quality Control assessments are largely dependent on data providers as reviewers.
    - An accuracy review process was piloted (including USGS staff and data providers) but needs further work and standardization as well as the establishment of an acceptable accuracy confidence threshold and report approval procedure.
    - For the final draft of the indicator, we created a comparison shapefile highlighting features that had changed from previous indicator, that seemed to help speed the review process and identification of omission errors.

- “Date of Protection” or “Date established” is still missing in many records. Format of data provided varies widely.
- The federal agencies are still refining their geospatial data to reflect ownership boundaries as opposed to administrative boundaries.
- PAD_US has ownership attribution errors in all owner types. For example: USACE properties are consistently labeled as Unknown ownership. There is the need to remove waterbodies from the dataset to properly reflect protected lands as opposed to protected areas. This process would have to be implemented retroactively to reflect land protections properly. There are also limitations on doing this and the assumption that waterbody boundaries do not change with time.
- We have removed the inclusion of legacy PLI data to allow for state corrections to be reflected in the indicator.
- The PAD US data should be only used to provide federal lands; however, we found the need to include data from the National Conservation Easements and other local data. We have heard from jurisdictions on the difficulty of removing lands that were erroneously included in PAD US data and the need to allow for state corrections be reflected in the data.
- Multi-part polygons are used inconsistently across all datasets, affecting the effectiveness of spatial comparison tools and processes. We need to consider exploding multipart polygons in the future. This ties up with geometry and topological issues we know exist, but we have not been able to address this in an effective manner.
- Maryland Datasets
    - Maryland provided 8 separate datasets of different vintages and with different data structures, some not compatible with PAD-US standards. Migration towards a more consistent structure and/or a single compiled source is desirable.
    - Some improvements made by the state. Many datasets were in PAD US schema, however older datasets with none or less frequent updates are not in PAD US schema.
    - Date of datasets: There is a lag period of when the data is updated and when the updated data is made available in iMAP. This lag makes it difficult to access up to date information to accurately reflect protected lands by the state.
    - Ownership of TDR/PDR datasets (Transfer Development Rights and Purchase Development Rights) are being labeled as PVT, but there is no indication in the dataset to label them otherwise. It is expected that ownership classifications be refined as local governments continue to incorporate the CBP standard.
    - Review aggregator source and prioritize state data. There are issues with overlapping datasets. For the most part it looks like discrepancies from the state datasets and PADUS.

    - There is a need to prioritize attributes to facilitate the use of a standard.
    - Lack of unified datasets
    - Reservoirs and lakes were missing from the datasets as well as some local properties.
- Virginia Datasets
    - Some lakes and reservoirs present in the source data are not separated from the surrounding land/park/protected area.
- Pennsylvania Datasets
    - PA provided 2 restricted datasets with their own specific schema.
    - There were several overlap polygons identified through the review process, some with different geometries coming from PAD US, state data was used, but the question remains to what extent this is an issue (not from the state but from PAD US).
- DC Dataset
    - Review of what should be included in an urban landscape protected area dataset needs review. Current data includes buildings and impervious surface sites.

Appendix B: History of Land Protection Tracking

Background
Since 2000, we, along with our partners, have been committed to tracking permanently protected lands within the Chesapeake Bay watershed. This collective endeavor was inspired by the ambitious goal of safeguarding twenty percent of the Bay watershed across Pennsylvania, Maryland, Virginia, and the District of Columbia, as established in the Chesapeake 2000 Agreement.

Initially, our efforts to report and track this significant goal were conducted through a straightforward tabular spreadsheet that compiled acreage totals submitted annually to the Chesapeake Bay Program. Responding to Executive Order 13508, we embraced an even more ambitious vision in the Strategy for Protecting and Restoring the Chesapeake Bay, which set the exceptional goal of conserving 2 million acres of high-priority conservation lands across the broader watershed, encompassing parts of Delaware, New York, and West Virginia, by the year 2025.

More recently, the monumental 2014 Chesapeake Bay Watershed Agreement introduced the Protected Lands Outcome, which aims to protect an additional 2 million acres of land recognized as high-conservation priorities by federal, state, or local entities by 2025. This includes a crucial focus on safeguarding 225,000 acres of wetlands and an impressive 695,000 acres of forested land, both essential for maintaining the pristine quality of our waters. As we examined our tracking processes, we needed to enhance our approach to encompass the entire watershed, benefitting from advancements in geospatial data and a collaborative spirit among various partners committed to sharing land conservation data through LandScope Chesapeake.

Tracking Land Protection – Transitioning from Tabular to Geospatial (GIS) Format
Transitioning to a GIS database for land protection information significantly improves the usefulness of our data for various stakeholders and objectives. This innovative approach enables us to visualize protected lands within the landscape and assess our progress toward achieving multiple conservation goals, including protecting critical ecological areas, wildlife corridors, and forested shorelines. In 2008, dedicated staff from the US Geological Survey (USGS) at the Chesapeake Bay Program Office took proactive steps to begin a data collection initiative to track protected lands within the Chesapeake Bay Watershed using this geospatial framework. At that time, the data we gathered reflected the most recent, reliable information from trusted partners, state and federal agencies, and renowned national non-governmental organizations like The Nature Conservancy.

Despite our challenges—such as the limited availability of geospatial data and inconsistent GIS systems—we persevered. Many properties overlapped within our dataset, leading to potential duplications. To tackle this head-on, we employed a topology tool in GIS to identify overlapping areas and ensure accurate accounting. This meticulous editing process occasionally led to slight variations in reported acreage compared to GIS-calculated figures. Ultimately, we established the first expansive GIS layer of protected lands across the entire Chesapeake Bay Watershed, which showcased an impressive 7.6 million protected acres. This foundation was built upon to establish a 2010 baseline value of 7.8 million acres, a significant milestone that marked our progress in tracking land protection.

With the rapid advancements in GIS technology and the emergence of new datasets, a fresh data collection initiative was conducted by the USGS team between December 2011 and July 2012. Most of the data gathered was up to date at the end of 2011. New national datasets, including the Protected Areas Database of the United States (PAD-US) and the National Conservation Easement Database (NCED), came into existence, allowing us to create a robust foundational layer of protected lands. However, we recognized that local-level details were often lacking in these datasets.

To ensure comprehensive coverage, we collected protected lands data from state agencies, a variety of non-governmental organizations, and regional land conservation agencies. This collaborative effort allowed us to create a robust foundational layer of protected lands. We then applied our topology editing process once more to accurately identify and rectify overlapping areas, allowing for a precise accounting of total acreage. Furthermore, the USGS team collaborated with 27 individual datasets to standardize them into the PAD-US format, complete with recommended attributes for protected lands GIS data. (For more details, please visit https://www.usgs.gov/programs/gap-analysis-project/pad-us-data-manual). Although some protected properties—such as those managed by smaller local land trusts that may not report their conservation efforts to the NCED or state agencies—might still be unaccounted for, our researchers

are confident that this dataset represents the most accurate and comprehensive tracking of protected lands in the Chesapeake Bay Watershed.

This extensive data collection initiative resulted in an approximate increase of 400,000 acres since the 2008 collection, bringing the cumulative total to around 8 million acres of protected lands within the Chesapeake Bay Watershed. The differences observed between the data collection efforts from 2008 and 2011-12 truly reflect our remarkable progress in tracking land protection in this crucial region. This significant increase in protected lands is a testament to our collective efforts and a cause for optimism about the future of the Chesapeake Bay Watershed. Together, we are not just preserving land; we are actively safeguarding our environment for future generations, and that is something we can all celebrate!

Today, we continue to improve our aggregation processes and identify gaps in our data to better track and report progress for the protected lands indicator. There is room for improvement, but we count with the support of jurisdictions and community of practice to help us shape the protected lands indicator to reflect in ground protections through the watershed.

Appendix C: Original Feedback Comments and Versioning Changes in the Protected Lands Indicator 2024 by Jurisdiction

West Virginia

- Here are my comments on the WV state-owned lands (I have not checked any of the other ownership classes because I assume you have reached out to those groups regarding their data). Specific comments are below, but in general, if there are boundary discrepancies, using the boundaries in the "State Provided data - WVDNR_WMA_PADUS_Fee_20250122" layers will be more accurate than what it looks like was pulled from PADUS. Please let me know if you need any further clarification or additional info.
- In the raster, state lands are classified as NGO
- Around 77.7507237°W 39.3297742°N, there are polygons labelled as state-owned, but I would think this is NPS property because I have no record of them being state-owned, and it is called "Harper's Ferry National Historic Park"
- The easements at 79.2929956°W 38.9367052°N and 78.8461788°W 39.2567470°N are assigned to state, but I have no record of them; they come from USFS GIS data so perhaps check with USFS to see if you can assign these parcels to them
- Several MD DNR properties are included
- The boundary for Thorne Creek Wildlife Management Area is accurate in the "State Provided data - WVDNR_WMA_PADUS_Fee_20250122" layer. The boundary pulled from PADUS is too large at the north end.

Delaware

- I took a look at the dataset (just for Parks) and there are two properties that should be removed completely: FID 142 & 167. There are some missing acquisitions that I've included in the shapefile attached. Also I noted there is a fair amount of conservation easements missing. Please see the link here: https://de-firstmap-delaware.hub.arcgis.com/maps/93f84280fdb1479eb7a9f1aca94e4ff8/about. Note that it has more than just conservation easements.
- I found 3 properties we acquired in 2024 that was not on your map. Please see attached shapefile. Let me know if you need anything else from me, thank you!

New York

- It does appear that you have included all the areas that are currently in our New York Protected Areas Database, plus areas from other sources.
- Regarding the discrepancies in the PowerPoint you sent: Slides 2 and 5 show lands owned by the Federal Government, with Local Managers USACE and USVA respectively, and both with Local Designation 'Other Land (DOD/DOE)'. We defer to PAD-US for data on federal lands in New York. Either these two parcels were not included in the latest download from PAD-US, or we did not include them because we're uncertain that they qualify as protected areas (since they are not managed by natural resource agencies). Slides 3 and 4 show lands owned by public universities. Again, we have not included them in the current version of NYPAD because we have not yet assessed whether they are truly protected areas, or just large undeveloped parcels that the owning universities are free to develop or convert should they decide to. Regarding changes in acreage of different categories of protected areas: The numbers for State Lands do reflect actual new acquisitions. However, the changes in numbers for other categories may be affected by two things:
    - Additional areas may not have been acquired during a given time period, but rather they existed already but were first added to NYPAD during that period.
    - Previous versions of NYPAD, before 2020, are not strictly comparable with versions since 2020. Starting in 2020, we pretty much rebuilt NYPAD from scratch. We have been more conservative than before and add only areas to NYPAD that we can confirm have permanent or very long-term protection. I would say in many cases, like the university lands above, we will eventually add these areas (or add them back) to NYPAD, but it will be an ongoing process for some time.
    - Having said all that, the data from NYPAD and from other sources that are displayed in your map package are the best data available, and they give the best view of currently protected areas in the New York portion of the Chesapeake watershed.

Maryland

- Please use what was downloaded in late spring since there have been no updates to MD iMap, except for the reservoirs in the local protected lands layer: https://mdgeodata.md.gov/imap/rest/services/Environment/MD_ProtectedLands/FeatureServer/5. We are still awaiting an update to this layer in MD iMap by DoIT. Please check in a few days to see if the reservoirs are showing up. If you need it sooner than that we can make other arrangements to get you the data.
- Attached you will find a geodatabase containing the Local Protected Lands dataset with the reservoirs corrected, and the other comments mentioned from the powerpoint will have to be addressed in a future update. Please let me know if there are any issues accessing this data.

Virginia

- I did a final review and just about everything looked great to me. The only things I found are a handful of properties that are labeled as Virginia Outdoors Foundation (VOF) easements but don't appear anywhere in their latest dataset. VOF started sharing not only easements they hold, but also "projects" with their GIS data several years ago. A project can be something VOF is simply funding through a grant, something their collaborating on, etc., in addition to easements they hold. It's darn confusing and a pain in the butt! I suspect these were erroneously added to a version of NCED and carried through to the present Cbay PLI data. I downloaded a copy of VOF's data yesterday and checked them all and they're now not included at all. So, the "projects" might have been finalized or otherwise removed. You're welcome to check yourself by downloading the data from their AGOL hub: https://open-data-vof.hub.arcgis.com/ Only the records containing "VOFE" in the "agreement type" attribute field are actually easements.

Pennsylvania

- Notes regarding PA_PLI2022_DifferencePLI2024
    - Reinman Wildlife Preserve is OWNED by Dickinson College
    - PACL (WeConservePA) does NOT include any designated land, including military bases. There is a minor exception, which you'll see in the data. 39°43'49"N 77°25'19"W
    - Your Cumberland County Ag easements are tracking ag security areas, NOT preserved farms
    - I have recommended you clip all rasters by USGS Hydrology polygons to removed waterbody boundaries
    - York ACE #290 (and others) – these farms are primarily on privately-owned land. Please switch Ag easement owners to Private. Regarding easement holders, there is often joint holders involving the Commonwealth, the County, and a local municipality. Regarding the other ACE boundaries in York County, Peach Bottom and Lower Chanceford Twp, the eased land are SUBSETS of the total owned parcels. Some of your old boundaries are sourced to a 2011 or 2018 dataset.

- PECO Energy / Exelon Recreation Lands in Lancaster County can be included, included in Lancaster County's open space dataset https://www.lancasterconservancy.org/wp-content/uploads/2021/03/SRCL-ILMP_Final-Integrated-Land-Management-Plan.pdf
- All Lancaster Farmland Trust in the 2025 data has been vetted to their internal records – all 2018 data should be dropped
- 39°48'59"N 75°53'2"W owned by Aqua PA Wastewater Inc
- All Brandywine Conservancy easements have been vetted to their internal records – the 2025 data is correct, drop 2018 data
- Blair County ACE (40°23'19"N 78°16'51"W) #--- = funded protection, easement number not yet attributed.
- Municipal Water authorities (40°30'22"N 78°8'23"W) added as the land protects a sensitive water source
- Municipal reservoirs and surrounding owned watersheds (40°32'26"N 77°31'57"W) added as the land protects a sensitive water source
- Saint Anthony's TNC easement is correct in the 2025 dataset – remove the 2022 layer
- The latest boundary for Fort Indiantown Gap (military exception) – state boundary correct 2025
- Endless Mountains Trail (and other trail / rail-trail owned land) now reflects tax parcel owned land - 41°51'21"N 75°46'6"W
- 41°44'45"N 75°27'49"W – NOT owned by Natural Lands – remove all + duplicates
- Luzerne Co - 41°18'44"N 75°46'20"W = remove, commercial owner ; 41°18'14"N 75°44'28"W = remove, commercial real estate
- 40°53'17"N 76°1'57"W – not clear why this was flagged, Weiser SF – Catawissa Rec Area
- Clinton Co - 41°17'38"N 77°32'22"W, 41°19'37"N 77°29'17"W = remove all + duplicates
- 40°42'15"N 78°48'28"W – Basking Hill Nature reserve – keep
- 41°30'38"N 76°7'35"W – SGL 057 protected in 2023 – keep
- 41°29'48"N 75°57'53"W – Pinchot SF – Miller Mountain Tract – keep
- 40°55'32"N 78°36'6"W – Curwensville Lake Rec Area – keep
- 39°46'16"N 78°39'44"W – Evitts Creek Water Corp – remove https://visitbedfordcounty.com/directory/koon-lake-and-lake-gordon/

[1]*Outlook:* Outlook is the forecasted trajectory for whether the Chesapeake Bay Program is on course to achieving the outcome. An outcome's outlook may be on course, off course, uncertain, or completed. This information will be incorporated into the outcome's progress page. An outcome's course outlook is reviewed and updated during the outcome's Strategy Review System (SRS) Quarterly Progress Meeting in addition to when recent progress is assessed.

[2]*Recent Progress:* Recent Progress describes the change in the indicator based on the most recent data collected since the last reporting period. The recent progress icon will reflect this change as an increase, decrease, no change, or completed, depending upon this progress. This information will be discussed at the outcome's Strategy Review System (SRS) Quarterly Progress Meeting.